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THE IMPACT ON THE ENVIRONMENT OF SURFACE MINING IN ALBERTA



**PROCEEDINGS
OF THE
PUBLIC HEARINGS**

PART I



**DECEMBER, 1971
JANUARY, 1972**

**ENVIRONMENT CONSERVATION
AUTHORITY**

ALBERTA



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THE IMPACT
ON THE ENVIRONMENT
OF SURFACE MINING
IN ALBERTA

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DECEMBER, 1971
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ENVIRONMENT CONSERVATION
AUTHORITY
9912 - 107 STREET,
EDMONTON, ALBERTA



THE PROCEEDINGS ARE PUBLISHED IN TWO VOLUMES.
VOLUME I CONTAINS THE PROCEEDINGS OF HEARINGS
HELD IN GRAND PRAIRIE, LETHBRIDGE, AND EDMONTON.
VOLUME II CONTAINS THE PROCEEDINGS OF HEARINGS
HELD IN CALGARY AND RED DEER, AND SUPPLEMENTARY
SUBMISSIONS TO THE AUTHORITY.

COPIES OF THE TWO VOLUMES
OF THESE PROCEEDINGS ARE
AVAILABLE UPON REQUEST TO:

ENVIRONMENT CONSERVATION AUTHORITY,
9912 - 107 STREET,
EDMONTON, ALBERTA.

PRICE: \$4.00

MARCH 15, 1972.

FOR E W O R D

Soon after its formation the Environment Conservation Authority had been requested by the Government of Alberta to conduct comprehensive and wide-ranging hearings on the impact on the environment of resource development in Alberta. More specifically, the Authority was asked through Public Hearings to review all present legislation and industry practices relevant to the conservation and reclamation of land that is disturbed as a result of coal, oil, gas and forestry development. Attention was also to be paid to the integrity of watershed areas.

The general objective of the Authority was, through the Hearings, to develop advice for the Lieutenant Governor in Council on preventive and reclamation procedures that were sufficiently adequate to assure that these resource developments might be conducted in such a fashion that permanent environmental damage would not result therefrom.

In November, 1971, the Honourable W.J. Yurko, Minister of the Environment, directed the Authority to move with particular urgency on those aspects of its Hearings on the impact on the environment of resource development that had to do with surface mining for coal. The Minister had previously expressed concern about the after-effects of mining practices with the announcement that surface reclamation legislation would be rewritten for presentation at the next session of the Legislature, and he wished to have the benefit of the advice that could be developed through Public Hearings to aid him in this task.

The Authority accordingly held Hearings in major population centres in Alberta in December, 1971, and January, 1972. These Hearings constitute the first phase of the enquiry requested of the Authority into the environmental effects of resource development in the Province. Subsequent phases on oil and gas development and on forest utilization are to follow.

DR. W. R. TROST, Chairman,
Environment Conservation Authority.

ACKNOWLEDGEMENTS

The contribution that a public hearing can make to the advancement of any subject depends entirely on the submissions, briefs and presentations made to it by members of the public. The Environment Conservation Authority is very much appreciative of the considerable efforts of individuals, groups and associations in preparing their submissions to the hearings, and indeed in acting to bring about the hearings themselves.

The Authority also very much appreciates the wise and thoughtful way in which the submissions were prepared and presented, all the more so since the subject of the hearings is one in which sharply held and conflicting opinions exist. Though the strength of opinion was in no way diluted in their presentation through the hearings, the reliance on reason, on logic and on a respectful attention to the views of others emphasized the broad areas of agreement that existed between conflicting parties. The hearings also directed attention and developed further insights into those areas of disagreement that might still have remained among the several sectors of the public after the hearings had closed.

The Authority wishes to thank and commend the participants in the hearings for the reasoned way in which they presented their own views, and the thoughtfulness with which they attended to the views of others.

THE IMPACT ON THE ENVIRONMENT OF SURFACE MINING IN ALBERTA

INTRODUCTION

**ENVIRONMENT CONSERVATION
AUTHORITY**



The Environment Conservation Authority has been requested by the Government of Alberta to consider the impact of resource development on the environment. To ensure that in the future the citizens of Alberta continue to prosper from the development of natural resources, it is necessary to know of and understand the wishes of the public; this being accomplished by public hearings. The hearings concerning "The Impact on the Environment of Surface Mining in Alberta" were to consider surface reclamation and the integrity of watersheds.

Pre-Hearing Preparation

The Authority provided three documents for the public as background information on which briefs could be based. These were: a prospectus; principles of proposed legislation; a situation report with respect to coal mining.

Considerable effort was put into ensuring as varied an input as possible. On November 16 a press conference was held in Edmonton to publicly announce the dates and places of the hearing, which were:

Hearing No. 1	Grande Prairie, Alberta. December 13, 1971.
Hearing No. 2	Lethbridge, Alberta. December 15, 1971.
Hearing No. 3	Edmonton, Alberta. December 17, 1971.
Hearing No. 4	Calgary, Alberta. December 21, 1971.
Hearing No. 5	Red Deer, Alberta. January 6, 1972.

Numerous environmental or concerned organizations, industries, interested citizens, and all coal mining companies and electrical utilities were initially sent a prospectus on "The Environmental Impact of Surface Mining in Alberta". This paper outlined the present and past state of the coal mining industry, explained some of the environmental concerns, and suggested a number of topics for discussion at the hearings.

As it was the intention of the Government to introduce legislation on surface reclamation in the 1972 session, the Department of the Environment had prepared a position paper entitled "Principles Underlying Proposed Surface Reclamation Legislation". This was made available to the Authority who in turn provided it to all those mentioned above.

A consultant was retained by the Environment Conservation Authority to prepare a situation report for the public hearings. Contained therein was an outline of the environmental problems associated with provincial surface coal mining operations, including exploration, extraction, processing and transport. It should be emphasized that the consultant's report was presented as a situation statement for public discussion, and the Authority does not take the position of necessarily agreeing or disagreeing with any or all of the statements in the report.

The Public Hearings

At each center where hearings were scheduled a representative of the consulting firm began the proceedings by outlining the situation report. Individuals and representatives of organizations and companies were then given an opportunity to present briefs on surface mining and/or to talk on the subject. After each presentation the Authority directed questions to the individual concerned in order to clarify certain points or to obtain further information and provision was made at the end of each hearing for a general discussion of the briefs. In total there were eighty-five submissions during the five hearings.

Supplementary Submissions to the Authority

The considerable interest generated by the public hearings was evident by the number of presentations at the hearings and by the several briefs transmitted to the Authority by individuals or representatives of organizations who were unable to attend the hearings. These briefs were received prior to, during, and for a short time after the hearings; to these were added briefs which commented on aspects of the hearings themselves, bringing the total supplementary submissions to twenty-one.

Reports on Hearings

All aspects of the public hearings are documented by the Authority in the forms of Transcript, Proceedings, Summary and Recommendations. The verbatim Transcript of the oral submissions and discussion is compiled from tape recordings of each of the hearings and is available for inspection at the offices of the Authority; it is not reprinted for distribution.

The Proceedings is a document of two parts, consisting altogether of about 1100 pages, available to the public at the offices of the Authority and can be purchased for \$4.00. All submissions presented at the hearings or sent as supplementary briefs and letters are included in the Proceedings. Questions asked by the Authority about each brief are also included. Where possible the original brief has been directly reproduced, however, variation in paper size and quality of copy has necessitated the re-typing of several briefs to suit the final format. Other documents in the Proceedings are the consultant's report, with questions asked by the Authority at the various hearings, and the background papers (Appendices A and B). Appendix C, "Recommendations on Surface Legislation in Alberta", was submitted as advice to the Authority by an ad hoc committee of the Public Advisory Committee on Environmental Sciences, Drs. L. Corbes, D. Detomaso, J.W. Kerr, and R.P. Pharis, all of the University of Calgary.

The Summary contains a condensation of each brief presented to the Authority and is published so as to provide a shorter version of the Proceedings for those who wish to obtain the main points of the submissions.

The Recommendations are drafted by the Authority, based on information obtained through the public hearings. These are forwarded to the Minister of the Environment for transmission to the Lieutenant Governor in Council.

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**ENVIRONMENT CONSERVATION
AUTHORITY**



ENVIRONMENTAL IMPACT OF
SURFACE COAL MINING OPERATIONS IN ALBERTA

ENVIRONMENT CONSERVATION AUTHORITY
EDMONTON, ALBERTA

November, 1971

F. F. SLANEY & COMPANY LIMITED
VANCOUVER, CANADA

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PART 1

THE PROJECT

1.1 REQUEST FOR STUDY

This project was carried out in response to a request by the Alberta Environment Conservation Authority for an outline of environmental problems associated with provincial surface coal mining operations, including exploration, extraction, processing and transport.

1.2 PRIMARY OBJECTIVES

The report is primarily intended as a comprehensive basis for discussion at public hearings. Primary objectives of the study were to:

1. Outline and discuss the effects of surface coal mining and their impact upon other natural resources in three regions
2. Describe protective, remedial and restorative measures to cope with those problems
3. Make a broad comparison of the benefits of surface coal mining in Alberta with the projected environmental consequences
4. Suggest a framework for appraising the costs and benefits of individual operations
5. Suggest methods for processing exploration and operating permit applications and for regulating mining operations so as to control their impact upon the environment
6. Determine additional study needs.

1.3 GENERAL APPROACH

The outline and analysis of environmental problems is based on existing knowledge of the type and extent of Alberta's resources, values attached to them,

and their rates of utilization. Material was gratefully received from the Conservation Authority, provincial government agencies, and others. Field surveys were under the direction of R. Webb, formerly of the Alberta Department of Lands and Forests.

Special contributions to the project were made by the following:

Ripley, Klohn & Leonoff Alberta Ltd.

Mining and geotechnical aspects in Parts 2 and 3. They have worked with mining companies in Alberta, solving soil and water problems.

Pearse Bowden Economic Consultants Ltd.

Economic considerations in Part 5. They are leading resource economists in Canada.

H. S. Haslam, P.Eng.

Exploration, mining methods and processing in Part 2. Mr. Haslam has a vast experience in mine management.

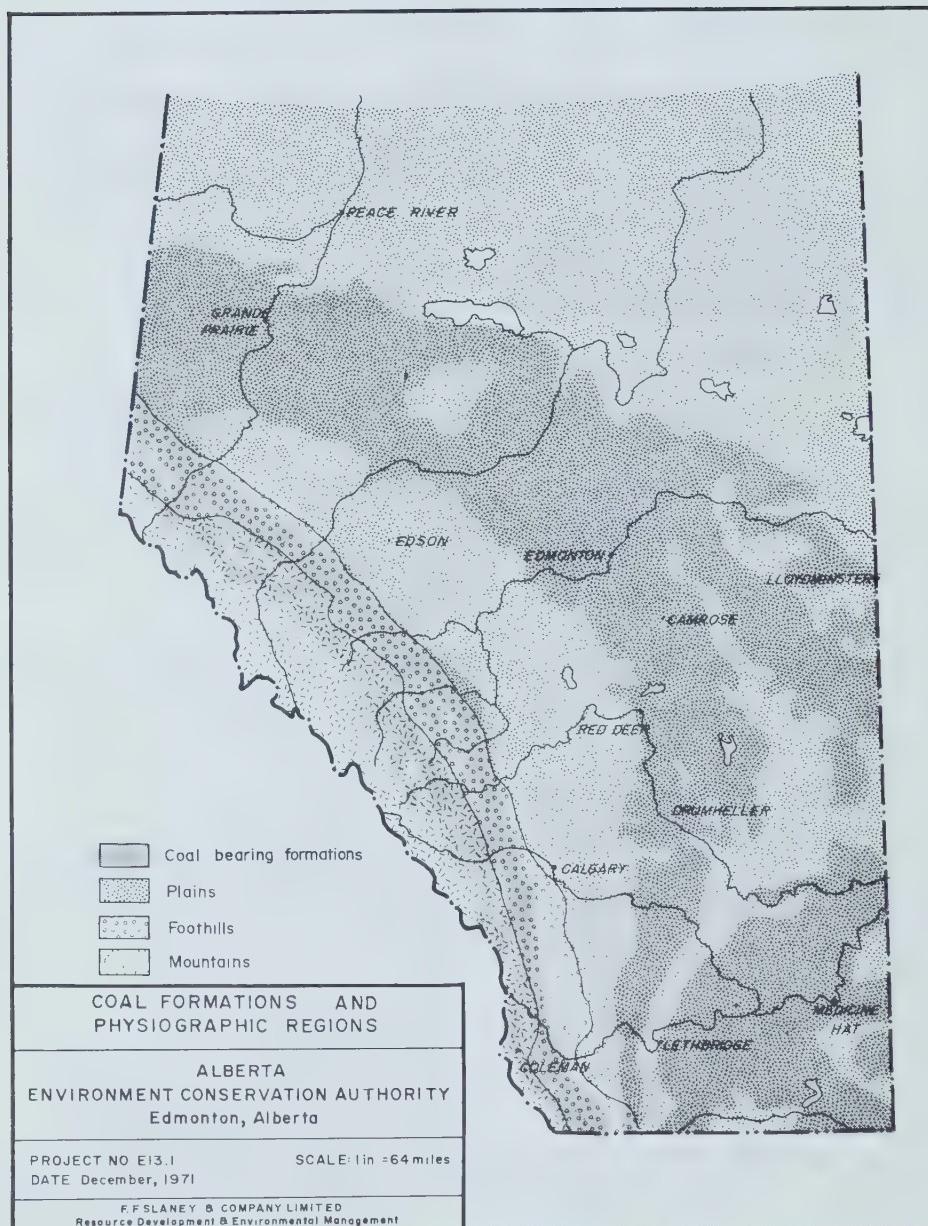
1.4 PHYSIOGRAPHIC REGIONS

For the purposes of analysis, the province was divided into three physiographic regions - Mountains, Foothills and Plains (Map 1).

1.4.1

Mountains

Rising to over 12,000 feet above sea level, this region of steep mountains, glaciated valleys and rugged topography supports a sub-alpine forest which gives way to alpine tundra between 7000 and 7500 feet elevation. Short growing seasons, severe climate and thin, easily disturbed soils have created a delicately balanced soil - water - vegetation complex which is susceptible



PART 2

SURFACE MINING IN ALBERTA

2.1 THE COAL SCENE

In 1969, coal production, in short tons, was as follows, with the number of producing mines in brackets;

	<u>Surface</u>	<u>Underground</u>	<u>Totals</u>
Mountains	287,851 (2)	879,372 (2)	1,167,223
Foothills	500 (1)	192,372 (1)	192,872
Plains	<u>3,034,154 (16)</u>	<u>121,381 (3)</u>	<u>3,155,535</u>
	3,322,505	1,193,125	4,515,630

In 1970, the last year for which figures are available, total production had risen from 4,515,630 tons to 6,675,687 tons.

Most of the coal reserves are of bituminous and sub-bituminous rank. The bituminous coal occurs in the Mountain and Foothill regions, and the sub-bituminous in the Plains.

Much of the coal in the Mountains and Foothills is of suitable quality for coking coal. During the past few years, the demands of the Japanese steel industry have caused an unprecedented interest in exploration work within these regions. Their desire to secure long-term contracts led to extensive exploration and to large operations, both underground and on the surface. Since 1969, several new, large surface mines have come into production and coal production has increased.

Although the potential of the Japanese market has ebbed somewhat, many of the larger oil and gas companies are looking towards coal as a means of diversifying their interests and it would appear that the current level of interest in coal exploration may be maintained.

to disturbance and slow to heal. Watershed, aesthetic and recreational values are particularly high. Some small areas support restricted wildlife and fisheries resources.

1.4.2

Foothills

This region of forest and grassland is adjacent to the Mountains and features rolling hills that rise gradually from the level and gently undulating topography of the Plains. It is traversed by numerous watercourses including several major rivers. Watershed, fisheries, wildlife, forestry, range, and recreational values predominate.

1.4.3

Plains

The topography ranges from flat in the east to gently undulating near the Foothills and is marked by river valleys, moraines and sand hills. The region supports a number of ecological types varying from prairie and aspen parkland through the aspen-spruce ecotone to mixed coniferous forest. Ranching, farming, forestry, and wildlife resource values are most significant.

PART 2

SURFACE MINING IN ALBERTA

5.

At present, the main use of the sub-bituminous coal of the Plains is for power generation. There has also been considerable activity in evaluating possible sites for large surface mines in the Plains region to be accompanied by thermal electric power stations. However, development will depend upon the availability of cooling water.

There are approximately 2.2 billion short tons of measured coal resources in Alberta. Map 1 shows the location of coal bearing formations in Alberta. "Measured" resources occur throughout. They are computed from actual observations and measurements which are so closely spaced and from which the thickness and extent of the coal are so well defined that the computed tonnage is judged to be accurate within 20 percent of the true tonnage. The minimum seam thickness considered is five feet. Not all of the available coal in the province has been measured to date. An estimated 45 billion additional tons is indicated or inferred from geological data and exploration.

It is estimated that about seven percent of the measured coal resources in the Mountains and Foothills (982,100,000 short tons) can be mined by surface methods, whereas all the measured coal resources of the Plains - (1,221,800,000 short tons) are potentially mineable by surface methods under present economic and technological conditions.

In the Mountains and Foothills, the very difficult mining conditions resulting from severe folding and faulting of coal seams, and the requirements for large deposits of high quality coal and financially acceptable coal: overburden ratios would appear to make it unlikely that many more surface mines will be developed in the future. In the Plains all measured deposits lie within 150 feet of the surface and may be mined by surface methods.

When compared to the total land area of Alberta, the amount of land actually disturbed by surface mining has been very small. The amount disturbed to date in all regions is less than 10,000 acres, a small fraction of one percent of the province's total land area. However, the geographically concentrated nature of surface mining can result in intense changes in the environment, and these in turn can affect areas much larger than that of the mine itself.

The area disturbed by exploration will be much greater than that disturbed by surface mining operations. Not all exploration is successful in terms of finding coal that can be mined economically by either surface or underground methods.

2.2 EXPLORATION

The effects of exploration are most severe in the Mountains and Foothills. The general exposure of the coal seams, resulting from severe folding and faulting, and the effects of natural erosion determine the exploratory approach. Surface trenching is carried out to expose the seams and learn more about the nature of the deposit before proceeding with the more expensive drilling operations. To determine the quality of the coal for various markets, it is usually necessary to excavate a test-pit or trench to obtain large samples from beyond the weathered or oxidized zone. This operation often leaves a substantial cut-and-fill excavation on the hillside. On steep hillsides, some excavation may also be necessary to provide level sites for drilling equipment. Roads are built on a short term basis to provide the cheapest access for exploration equipment. The road is made by running a bulldozer through the vegetation, and the surface is usually the coarse fraction of surface soils. Roadside ditches are seldom dug, and crossings over minor streams are usually fords or crude log culverts.

After exploration work has been completed, there remains a network of roads, trenches and drillsites extending for many miles, often over very steep slopes. The disturbance of surface soils and vegetation is often severe and long-lasting. The effects are compounded by the steep gradients over many of these roads.

In the Plains, the horizontal coal seams are generally covered with a mantle of glacial drift and are exposed only where major streams have cut deep channels. Thus, exploration is mainly restricted to drilling operations, although test-pits must be excavated to obtain bulk samples. In forest areas these activities will also necessitate the cutting of exploration access trails.

2.3 MINING METHODS

The method of mining depends upon the configuration of the seam in relation to the surface topography.

The coal deposits of the Plains are generally found in horizontal seams lying at relatively shallow depths below flat to gently rolling terrain. A trench is cut through the overburden to expose the coal seam, and the overburden is placed to one side. After the coal has been extracted, an adjacent, parallel cut is made, and the overburden is placed in the previously excavated cut. This process of area stripping is continued until the economic limits of the coal deposit have been reached. After mining, the land surface consists of a series of parallel spoil ridges and an open trench in the last cut.

The coal seams in the Foothills and Mountains have been subject to severe folding and faulting and are usually steeply inclined. The variable pitch and topography do not lend themselves to contour stripping as practised in

the Appalachian coal fields, and the method employed in Alberta is normally some form of open-pit mining.

Once the coal seams have been located and a mining plan prepared, the overburden is removed and dumped outside the planned mine areas. Unlike area strip-mining, the amount of land disturbed is significantly greater than the area of the pit itself. There is no mined-out trench for disposal of overburden, and so it must be dumped onto the side of the hill. Open-pit mining occurs in a wide range of geological and topographic conditions, and so the final profile may vary from a series of benches and high walls to an actual pit.

2.4 TRANSPORT AND PROCESSING OF COAL

Before coking coal can be marketed, certain quality criteria must be met in order to satisfy contract specifications. This involves a series of processing facilities at the mine site. When the coal is extracted from the pit it is broken down to a maximum diameter of four inches and washed to remove the dirt and dross. After being dried, the coal is sorted to satisfy the size requirements of the contract. None of the mines producing coking coal have coking facilities. All coal is marketed as raw coal.

A washing process may extract from 25 - 35 percent waste material. Some of this material is combustible and can be used to supply the thermal plants which provide the heat for the drying process.

As production increases, these residues may be used to generate electric power on a commercial scale. A power station being built at the site of McIntrye Coal Mines in the Smoky River area is scheduled for operation by mid 1972.

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SURFACE MINING IN ALBERTA

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In the Plains, thermal electric power stations are associated with the larger mines. Before being used, the moisture content of the coal is reduced by thermal driers. The coal must also be broken down to a suitable size.

In addition to the sites required for the construction of these facilities, areas must be found for the disposal of washery wastes and fly ash sedimentation ponds and waste piles.

Haul roads are necessary for transporting the coal from the mine to the processing plants, and roads or railways are required for transporting the processed coal to market.

PART 3

GEOTECHNICAL ASPECTS OF THE SURFACE MINING OPERATION

3.1 IMPACT ON THE PHYSICAL ENVIRONMENT

3.1.1 Erosion

The extensive slopes of waste and rock usually associated with surface mining are generally bare of any vegetation and are exposed to the full action of wind and rain. These erosive forces will cause a significant increase in the sediment loads of local stream systems. The U.S. Geological Survey have calculated that the sediment yield from strip-mined portions of a watershed can be measured at 10 to 1500 times the sedimentation yield from undisturbed land.

Erosion of slopes takes place in two ways, as sheet erosion and as gullying. Sheet erosion occurs with every rainfall, as individual raindrops displace particles of soil and free surface water carries the particles downward. Gullying develops in depressions on a slope, or wherever surface flows are permitted to concentrate in small streams. Some measure of gullying usually occurs on long slopes.

The construction of roads for exploration and for hauling coal within a mined area creates severe problems in erosion and in destruction of drainage patterns. Many roads are built on sidehill slopes, leading to a great deal of surface disturbance and resulting erosion. Such roads also concentrate surface drainage at low points or at culverts. Such roads are commonly built on gradients so steep that roadside streams scour the ditches and carry a heavy load of sediment.

On the Alberta Plains, erosion connected with surface mining is not likely to be a serious problem because of the topography.

3.1.2 Slope Instability

It is inevitable that mining in mountainous areas leads to sidehill construction of roads, waste piles, storage piles and similar structures. Very often built in dry weather, such structures tend to slide when saturated. The consequences of slides of waste piles may be serious in terms of public safety, and deserve detailed study. The consequences of slides from cut-and-fill road construction may be progressive deterioration of the slopes downhill, a condition that can be corrected with difficulty, if at all.

The interception of groundwater may contribute to slides adjacent to sidehill excavation, especially as a flow of water from a rock face or bank tends to freeze in the winter.

A common companion to coal is shale, a laminated rock derived from the metamorphosis of silts and clays. Some shales are unstable in air, especially when unconfined and exposed to water, and quickly revert to the parent materials. Waste piles and sidehill structures of these shales may appear to be stable when first constructed but become most unstable after a period of weeks or months.

In addition to their effect on surface cover, unstable slopes and slides may encroach on a mountain stream and set up a condition of instability that persists for many years.

3.1.3 Chemical Activity

When freshly broken rock or soil are exposed to air and moisture together, chemical reactions proceed very rapidly, releasing the normal products of geological aging and weathering at a greatly accelerated rate. Such rapid chemical action requires, however, that all three conditions be met -- fresh material, air supply and water. If water is sufficiently plentiful to carry the salts away, the effect on water quality can be severe and immediate.

The coal measures of Alberta in general do not promote acid drainage. At the same time, the natural alkalinity of some foothills streams has been increased by one documented example of mining development, and further increase can be expected as development progresses. Considering that some natural stream flows now require treatment to reduce total hardness for domestic use, the effect of widespread mining may be to increase the load on certain treatment facilities.

Precipitation of iron compound occurs in several streams flowing from abandoned underground mines in the Crowsnest Pass area and so chemical pollution should always be considered as a possibility.

3.2 PROCESSING ACTIVITIES

3.2.1 Coal Treatment Plants

Coal treatment plants will undoubtedly be features of the major coal mines developed in Foothills and Mountains. These plants are conventional industrial installations and occupy relatively small areas of level ground, but three auxiliary surface facilities commonly associated with such plants deserve comment.

3.2.2

Waste Piles

Coal waste piles present a particular problem in some areas because they tend to ignite spontaneously. Fortunately in Alberta the coal appears to be deficient in the minerals that trigger this type of combustion so the problem should not be serious.

3.2.3

Sedimentation Ponds

Sedimentation ponds are used to dispose of the fine waste removed from coal and to permit re-circulation of the water in the plant. The waste is pumped as a slurry to the pond where the solids settle out. In time the pond may be dewatered and dredged for re-use, but the fines must then be stored in the vicinity in permanent storage behind substantial embankments. Because they are fine enough to be carried readily in streams the fines should be isolated from flowing water.

3.2.4

Thermal Plants

Large thermal plants are usually incorporated in coal treatment plants because the fuel is readily available in waste coal and because a large volume of heat is required to dry the product. The thermal plants create some air pollution, but the flue gases from Alberta coal contain little sulphur dioxide and noxious fumes. Ash from the thermal plant would probably be piped to disposal with the fines from the treatment plant. Cooling water circulated through the thermal plant would raise the temperature of receiving water in lakes and streams.

3.3 PROTECTIVE, REMEDIAL AND RESTORATIVE MEASURES

3.3.1 Pre-Planning

The key to success in all control measures is pre-planning. With proper planning, many deleterious effects can be prevented, and others remedied with much less expenditure of time, effort and capital. Remedial and reclamation projects are not always economic propositions to the company but, given that these measures are required by government, there are methods and approaches that are more economic than others. For example, pre-planning will reduce the amount of overburden that has to be re-handled to achieve a topography suitable for post-mining use and will allow more efficient allocation of machine time.

Planning is required in work affecting drainage and road construction.

3.3.2 Drainage

Before a company begins work in an area it should construct catchment ponds in the small streams downhill from the work, in anticipation of sediment entering these streams with the first rainfall. The catchment ponds should then be inspected at regular intervals to ensure that they are effective in preventing the downstream migration of sediments. As the ponds fill they must be excavated or enlarged.

In connection with developing a coal property in mountainous areas it may be necessary to divert a natural water course. Such a diversion must be described in detail in the operating plan and must be constructed, if approved, with consideration for criteria of length, gradient, stream section, and bed material.

3.3.3

Roads

Roads must be planned and constructed with the following objectives:

1. To minimize the effect of road construction on stream systems, following high ground between watersheds where possible
2. Avoid sidehill construction on steep slopes where possible
3. Construct a road to a minimum width compatible with use, using turn-outs where needed
4. Build stream crossings to minimize effect on stream gradient and cross section
5. Use of mechanical and biological methods of bank and ditch erosion control.

During the exploration phase, the road system should be located first on aerial photographs, following principles and standards established by the province. The plan may be modified as exploration proceeds but only after approval. The principles of location and construction must be observed throughout. If the exploration team decides that development cannot proceed in any area, the roads that are not required for further use should be "bedded down" in accordance with standards set by the province. Some points to be observed are:

1. Minimize effect of narrow sidehill roads on surface drainage by regrading them away from the hill
2. Constructed water bars across the road on gradients steeper than approximately five percent
3. Rip the surface of all consolidated road beds to permit early revegetation
4. Excavate and remove all culverts and stream crossings to minimize further sedimentation.

The location and construction of haulage roads can be planned to minimize the impact of the roads on area drainage and topography, also to provide roads that perform better during winter break-up, are easier to maintain, and permit rapid haulage. When rendered obsolete by progressive development of the mine, roads should be "bedded down" according to plan, following standards set by the province.

When reclaiming exploration roads, test-pits and trenches should also be graded wherever possible unless the mining operation is expected to overrun them in a short time.

3.3.4 Overburden and Wastes

The intrinsic value of topsoil should be generally recognized and accepted. Generally the surface soil should be stripped, stored and replaced in final grading. If necessary, and where possible, the surface soil should be mixed with a coarse gravel or rocky soil to inhibit erosion by water and wind, and to prevent compaction. The stripping, re-handling and final disposition of the surface soils should be planned in all significant detail, and approved by the licensing authority.

During the removal of overburden an operator may encounter soils or rock that would be undesirable if exposed to air and water, and the operator must identify these materials and plan his earth-moving procedures so that they are safely buried. Examples of these materials are:

1. Chemically reactive soils or rocks
2. Unstable clay shales or mudstone.

The stability of waste embankments is given treatment in a pending publication of the federal Department of Energy, Mines and Resources, "Tentative Design Guide for Mine Waste Embankments in Canada". Its recommendations should be followed wherever spoil banks, waste embankments, sedimentation ponds or similar structures are built.

To ensure that waste slopes can be revegetated calls for surficial treatment of a certain type. In general, that additional work is:

1. Grade the top and terraces of a waste pile inward, to discourage surface flows down a slope
2. Establish terraces on level grades at vertical intervals of no more than 50 feet
3. Grade the slope to a maximum of one on two, or 27° from the horizontal
4. Incorporate some topsoil in finish grading if possible.

3.3.5 Removal of Facilities

When a coal mine has been exhausted, coal treatment plants, thermal power stations and all similar installations should be dismantled and removed, and the site prepared for revegetation.

3.4 REGIONAL ASPECTS OF GEOTECHNICAL PROBLEMS

3.4.1 Mountains and Foothills

The problems encountered in the Mountains and Foothills are similar. Although both regions have exceedingly steep slopes, not all of the land surface is steep. In fact, surface mines occur on relatively gently sloping sites, even in Mountain regions.

Bare slopes result from the construction of roads, spoil heaps and waste piles. The cut-and-fill method of road construction which is necessary on steep slopes denudes areas much greater than that of the road itself. The exposure of these bare slopes to the elements leads to soil particles being washed downhill and increased stream sediment loads.

The hillside construction of roads, spoil heaps and waste piles, which is usually necessary in the Mountains and Foothills, may lead to landslides unless the provisions described in sections 3.3.3 and 3.3.4 are implemented to ensure slope stability. If construction proceeds without due care, progressive destruction of downhill slopes may occur and stream channels may be disrupted.

Because of the open-pit method of mining employed in the Mountains and Foothills, all of the excavated overburden must be stored outside of the pit area until the mining operation has been completed. This may require substantial additional area of disturbance. The handling of overburden will require much supervision to ensure that the minimum amount of re-handling is necessary.

If the overburden is to be backfilled into the pit, substantial amounts of top-soil will have to be stored throughout the life of the mine to enable subsequent revegetation.

3.4.2

Plains

Most of the geotechnical problems associated with the Mountains and Foothills do not occur in the Plains because of the lack of relief and the area-strip method of mining.

Although bare slopes are subject to erosion, there is little problem with increased sedimentation as drainage is usually internal to the mine site. Only the overburden from the first cut lies outside the pit area, and sediment from that source is insignificant.

The area denuded outside of the pit area is much smaller than in the Mountains and Foothills. Most of the overburden is dumped within the pit area and cut-and-fill methods are not usually necessary in road construction in the Plains. Topsoil need not be stored for long periods because reclamation can be continuous. Fresh topsoil can be placed immediately on top of existing overburden heaps.

PART 4

EFFECTS ON OTHER NATURAL RESOURCES

AND THEIR MANAGEMENT

4.1 GENERAL REVIEW OF IMPACT AREAS

Although these effects are discussed separately, much of the impact is due to the complex interrelationships occurring between them.

4.1.1

Watersheds

Water resources are of vital importance both provincially and nationally. The Saskatchewan River system supplies water to 85 percent of the population in Alberta and 42 percent in Saskatchewan. The Peace and Athabasca Rivers contribute significantly to northern ecosystems. Any modification of river characteristics may have long-lasting effects on the ecology and economy of areas far beyond the borders of Alberta, or, indeed, Canada. The Milk River, which flows eastward through northern U.S.A., also rises in Alberta.

The alteration of normal surface and sub-surface drainage patterns may have serious consequences. Damage to stream banks, blockage of stream channels and sedimentation cause changes in stream profiles, reduce the storm-carrying capacity of watercourses and increase the danger from flash floods. Sedimentation will also cause the premature silting of reservoirs, with resultant effects on hydro power generation and water supply for domestic, industrial and agricultural use.

Removal of vegetation and the greater capacity for water retention by spoil banks affect the properties of watersheds. Reports of some established coal-fields in the U.S.A. indicate that the increased water storage capacity of a

high density of spoil heaps can have a beneficial effect on stream flows. In Alberta, these effects are not expected to be significant.

As well as its effects on ecological, recreational and aesthetic values, any deterioration in water quality has important consequences for domestic and industrial consumers downstream and may necessitate the provision of costly treatments.

Headwaters of the Saskatchewan River within Mountains and Foothills regions supply about 87 percent of the system's total annual flow and are protected by the National Parks and the Eastern Rockies Forest Conservation Area.

While water is the most important product of the Conservation Area, watershed protection and improvement may be attained along with the utilization of other resources. However, as watershed management becomes intensified, greater emphasis will be placed on water quality, and so the effects of surface mining must be controlled.

4.1.2

Ecosystems

Ecosystems are the result of interactions between topographic and climatic factors as well as plants and animals. Changes in any of these factors may have repercussions not only where the stimulus occurred but also in related ecosystems.

During land clearing, attention must be paid to slash disposal. Any outbreak of fire, insects or disease would have a significant impact upon vegetation.

4.1.2.1 Wildlife

Wildlife requires vegetation for food, shelter and escape cover. Each species has become adapted to a certain vegetation pattern, and any change in that pattern could cause changes in wildlife populations.

On areas physically disturbed by mining operations, wildlife habitat is usually destroyed. The impact of such disturbance depends upon the importance of that site to any wildlife species. Where a species is common and there is no shortage of suitable habitat, the impact is small, but where a species has only a limited distribution, any disturbance may have a significant impact upon its survival in that region. The limited winter range of bighorn sheep and goats in the Mountains is an example of the latter case. There is a whole range of intermediate situations, and the impact must be predetermined for each mining operation.

Mining operations may also disrupt seasonal migration patterns. This can be especially important for mule deer, elk, moose, and bighorns in the Mountains and Foothills.

The very presence of human activity is sufficient to discourage certain species such as grizzly bears from using suitable portions of their mountain range.

With proper planning, reclamation can provide a valuable diversification of habitat suitable to certain species. Indeed, wildlife habitat can sometimes be produced elsewhere to compensate for loss or provide some where none previously existed. However, mirror-like duplication is not technologically possible and some changes in the type and extent of wildlife usage are therefore inevitable.

4.1.2.2 Fish

Fish populations are very susceptible to the effects of mining. Any major change in environmental conditions will either effect a change in species composition or eliminate fish from the stream altogether. More valuable species such as cutthroat trout in the Mountains and Foothills often suffer while less valuable species thrive.

Although adult fish can tolerate relatively high sediment loads, deposition of silt and precipitation of iron compounds on stream bottoms will increase mortality of eggs and juveniles by reducing the supply of oxygen. Many of the sediment problems reported in the literature are the result of large-scale discharges, but gradual deposition is sometimes as important. Arctic grayling of the Athabasca and Peace drainages are susceptible to these effects.

The routing and treatment of exploratory and haul roads is as important as the extraction process.

Together with sedimentation, disruption of natural drainage patterns and blockage of stream channels will alter stream profiles and the amount and timing of water flow. Fish species are limited in the water velocities they can negotiate, and changes in stream flow may effect changes by eliminating a species from certain parts of the stream or by preventing its movement.

Chemical pollution from mining operations is of limited importance in Alberta if one considers that the iron "problem" is physical, not chemical.

The only known chemical effect of any magnitude is an increase in calcium carbonate and consequent increases in pH, but this has apparently little effect on fish.

The removal of streambank vegetation affects fish both directly and indirectly. Direct effects are increased water temperatures, which also occur with the addition of warm water from thermal power stations, and the loss of cover, which has important consequences for fishes with regard to the carrying capacity of streams.

Indirect effects include changes in invertebrate fauna, a major food source for fishes. As well as supporting terrestrial insects, streambank vegetation provides most of the energy input into stream ecosystems, and the loss of this energy source will bring considerable changes in the composition of bottom fauna. Aquatic invertebrates are also affected by changes in stream flow and by physical and chemical pollution.

In lakes, turbidity caused by colloidal matter may reduce productivity and alter thermal patterns by restricting sunlight penetration. The significance of these effects is extremely variable, depending upon relative volumes and temperatures, circulation, oxygen concentrations, etc., and each lake should be investigated individually.

4.1.3

Recreation

Hunting and fishing are part of the Alberta heritage and play a major role in the recreational activities of its population. Thus, anything that materially affects fish and wildlife could have a significant impact upon available recreational opportunities.

Mining operations may affect the amenity of existing recreational facilities such as parks, campsites and picnic sites. Noise is an important factor, especially for those wishing to escape the industrial noise of urban areas.

Air pollution in the form of dust and smoke is a nuisance factor. Noxious fumes are unlikely to be a problem because of the low sulphur content of the coal.

Lakes and streams are valuable for a number of water-based activities, and any deterioration in water quality may seriously affect their recreational potential. Obstructions and alteration of stream profiles will also affect the value of streams for canoeing or general enjoyment.

One of the possible benefits of mining is that it can provide access and increase the area available for intensive recreation. With proper planning, reclamation may provide recreational facilities such as small lakes, campsites and sites for cottages and commercial recreation ventures. Thus, in areas where such recreational facilities are lacking and budgetary considerations prevent their provision by government agencies, the mining industry can make a significant contribution. Public access to fragile areas with wilderness value, however, would destroy rather than enhance recreational attributes.

4.1.4

Aesthetic, Scientific and Educational Values

Aesthetic values relate to beauty in nature. The visual impact of mining operations depends upon the degree of contrast between the mine and its surroundings and the effectiveness of screening. However, aesthetics relate not only to visual beauty, but also to the concept of nature itself – an un-harnessed system of entities, forces and events. Thus, to many people, any industrial activity in wildlands represents a loss in aesthetic values, and no amount of screening or reclamation can prevent that loss. Scientific and

educational values associated with unaltered ecosystems are also fragile and irreparable if destroyed. The scarring of high mountain slopes and valleys of the Rockies by coal exploration as well as extraction processes represents a threat to the area where such values are high.

4.1.5 Resource Management

Surface mining operations result in a temporary loss of the productive capacity of the land. They can also interfere with or augment the existing resource management practices in the area.

4.1.5.1 Forestry

Most valuable commercial forest stands are found in the Foothills region. If the area cleared carries mature forest, there is no loss in timber values because the felled timber may be sold or used in the mining operation.

If the area carries timber of unmerchantable size, the growth of previous seasons has been lost. This is especially important if either the Forest Service or a forest company have an investment in forest establishment.

If a mining operation falls within a sustained yield forest management unit, the cutting of both mature and immature stands could have a detrimental impact on the forest management plan and cutting schedules.

One of the advantages of mining industry development, especially in the Foothills, is the provision of access, which may allow the commercial management of previously inaccessible forest areas.

4.1.5.2 Fish and Wildlife Management

In Mountain and to a lesser extent Foothills regions, improved access can result in greatly increased pressure on fish and wildlife resources. Managing agencies as a result must increase both effort and expenditures in order to maintain acceptable levels of administration. Traditional ways of hunting, trapping and fishing are disrupted, to be replaced by different methods often practiced by different people.

Governments often are not able to quickly adjust their programs, approaches and budgets and a management lag develops. This lag, plus the dislocation of established resource use patterns, are seldom met with immediate approval by public organizations representing the users of the resources.

4.1.5.3 Grazing

Cattle ranching is important in the Foothills and the Plains. The proximity of mining operations disturbs cattle, and so the area removed from grazing is slightly greater than that actually destroyed. However, the area actually disturbed by surface coal mining is small when compared with the total area of rangelands.

4.1.5.4 Cereal Production

The Plains region contains some of the finest dry land cultivation areas in Canada. Continued cereal production is limited as much by economic and social conditions and world markets and distribution systems as by biological or physical factors. Although individual farmers may lose productive land, they are presumably compensated by the mining company. The loss of a relatively small area of cropland is not important to Alberta as a whole

providing it is only temporary and that reclamation and restoration of productivity follow within a reasonable time.

The effects of surface mining may extend beyond the actual mining area. A dry, and at times windy climate combined with friable soils already creates problems with dust storms. Dust blowing from areas disturbed by surface mining will add to this problem. Dust is not only an inconvenience in urban and rural communities, but may also cause damage to crops by abrasion.

One advantage of land disturbance is that it breaks up the hard pan in solonetzic soils and, with reclamation, may lead to more productive soils.

4.2 WAYS OF PREVENTING AND MINIMIZING IMPACT

4.2.1 Multiple Resource Planning

When planning post-mining use, not only the physical and biological limitations of the site must be considered, but also the current and projected land-uses of the surrounding area. The reclaimed land should complement large scale land use patterns. Disturbed land in the Foothills region should not be reclaimed for cereal production if in some remote forest area. Such land would be better restored to forest or reseeded to raise its wildlife capability.

Planning will identify objectives, rationalize procedures and lead to realization of the same or a better type of land use on disturbed areas.

4.2.2 Management Plan

Following the experience of countries where reclamation has been an accepted principle for many years, a management plan should be drawn up before any

disturbance takes place. The plan should outline the projected land-use and the means of achieving it and describe the actions to be taken to reduce or eliminate the undesirable effects of surface mining before, during and after the operation. Initial seeding and planting to achieve a green cover may be only the first step in a program of soil conservation and land-use development. Although further grading should not be necessary, subsequent manipulation of the plant cover may be required to produce food and cover and thus achieve maximum wildlife benefits, for example.

4.2.3

Impact Studies

Impact studies should be locally carried out to form the basis for the management plan. Only when the problems have been identified can steps be taken to reduce or eliminate the undesirable effects of surface mining.

The following factors should be considered: climate, topography, drainage, soils, vegetation, wildlife, aquatic fauna, resource use patterns (current and projected), access, settlements and human interest areas.

4.2.4

Job Supervision

Well considered and practical management plans will be of limited use if they are not properly implemented. The best means of ensuring adequate implementation is to make one agent responsible for extracting the coal and another responsible for all other phases of the plan - erosion control, land clearing, road building, spoil placement, regrading, backfilling and revegetation. He will also be responsible for monitoring all environmental effects so that the plan can be modified to accommodate unforeseen circumstances. In this way the provisions of the management plan will not be jeopardized by concern for efficient extraction.

4.2.5 Remedies

The control measures described in Section 3.3 will reduce or eliminate much of the damage to watersheds in Mountains and Foothills, a prime consideration in Alberta. The importance of installing erosion control facilities before the operation begins cannot be overstressed.

These measures will reduce but not eliminate detrimental effects on water-based recreation and on aquatic fauna. If mining necessitates disturbing streamside zones, the stream should be temporarily diverted to avoid continuous siltation. This act will not be without some impact on downstream aquatic systems, however, and should be undertaken only with full understanding of effects. If possible, care should be taken to protect the original stream course and adjacent vegetation so that the stream may be later restored.

It is possible to mitigate against loss of wildlife habitat by providing alternative habitat. For example, as demonstrated by the provincial Fish and Wildlife Division, clearings may be cut in the forests of the Foothills and Mountain regions and planted to provide compensatory forage for elk and sheep. Ponds can be created to compensate for those drained during the mining operation.

Most cattle ranges are managed quite extensively, and grazing losses in many cases can be mitigated by intensifying management on remaining areas. Improvement in animal husbandry and the use of vegetation management practices can compensate for temporary acreage losses.

At certain sound frequencies, noise levels may be reduced by leaving strips of trees between mining operations and recreational facilities, the width of the strips depending upon the desired amount of sound attenuation.

The leaving of tree strips is also a means of preventing the loss of scenic values and should be common practice in all forested areas. Tree cutting and the displacement of overburden should be planned so that the mine is continuously screened from view. Even in treeless areas, the effect of spoil piles on the landscape may be reduced by proper planning. However, it will be impossible to screen all operations.

4.2.6 Reclamation

4.2.6.1 Site Preparation

To obtain a site compatible with any projected land use, grading, back-filling and the setting of drainage patterns will be required. The management plan will have ensured that, throughout the operation, spoil placement has been carried out in a manner that will minimize the amount of final contouring that is necessary. During final grading and replacing of soil material, care should be taken to avoid compaction. Mixing the soil with coarser material will help, but compacted surfaces may have to be loosened before revegetation can be successful.

4.2.6.2 Revegetation

The most effective method of achieving surface stabilization, reducing wind erosion, and promoting soil conservation is to establish a network of plant roots. Under optimal climatic and soil conditions, natural revegetation may be possible within a short period of time, but these conditions are rare in Alberta. As there appear to be no serious problems with toxicity in the province, revegetation through artificial means should be undertaken as soon as the site has been prepared and the topsoil replaced. Any delay will result in the fine soil particles being eroded downhill, into the soil profile, or wind blown.

The type and method of revegetation depends upon conditions at each site and upon the projected land use. Because of lack of information about the range of conditions which may be experienced at each site, research and organizational plant trials are advisable soon after mining operations commence. Good early results in mountain areas of Alberta have been achieved by using a mix of the following grasses: creeping red fescue, crested wheat-grass, timothy, brome and Kentucky blue grass. The species used should be suitable for achieving the projected land-use and should have as many of the following characteristics as possible:

- a) native or naturalized species;
- b) ability to regenerate naturally on industrially disturbed land or in severe natural habitats;
- c) proven effective in reclamation work elsewhere;
- d) readily reproducible in large quantities by natural or artificial means;
- e) low water and nutrient requirements;
- f) high rate of root dry matter production; and
- g) nitrogen-fixing ability.

Trials should yield information on species performance, possible species combinations and the best timing and density of seeding and planting. Mulches may be applied to increase the water-holding capacity of the surface and improve its chemical properties, such as pH and nutrient status, to reduce wind and water erosion and to moderate soil temperature extremes. Irrigation may be feasible at some sites in the Plains, especially where the land is to be reclaimed for arable production. Fertilizers will, in many cases, aid in the rapid development of a plant cover.

The method of revegetation - hand planting, hand seeding, agricultural seeding, hydro-seeding, aerial seeding, etc. can be varied to suit the circumstances.

4.3 REGIONAL ASPECTS OF RESOURCE CONFLICTS

4.3.1 Mountains

The Rocky Mountains are part of the Canadian heritage, and any industrial development will meet with considerable opposition despite the fact that large areas are protected within Banff, Jasper and Waterton Lakes National Parks. Special considerations are advisable in sensitive areas with demonstrably high resource values. Inviolate buffer zones adjacent to parks, particularly in heavy use transportation corridors, would reduce conflicts. In the alpine tundra, short growing seasons, severe climatic and edaphic conditions and rugged topography have created extremely delicate ecosystems which are difficult or impossible to restore. Even if the area actually disturbed is quite small, the effect may be significant in the Mountains. For example, the continued existence of bighorn sheep and mountain goats depends upon the protection of key winter ranges.

Together with the Foothills region, the Mountains provide about 87 percent of the annual flow through the Saskatchewan River system and make significant contributions to the Arctic rivers. The four surface mines currently operating in Mountain watersheds do not have a significant effect on water quality, although local streams may suffer some damage. However, extensive exploration activity and future mine developments must be carefully regarded.

4.3.2 Foothills

The Forestry Trunk Road and numerous access roads, including those of the mining industry, have made this region extremely valuable for recreation. Opportunities for hunting and fishing are excellent. Each year, many thousands of Albertans enjoy camping, hiking and driving through the Forest Reserve. As recreational use increases, the impact of any mining operations will become more significant. At present, there are only two surface coal mines operating in the Foothills, and so the impact upon recreation over the region as a whole is very small.

Although wildlife is abundant throughout the Foothills, attempts should be made to provide alternative habitat whenever surface mining operations threaten ungulate winter range.

4.3.3 Plains

Land clearing, drainage of sloughs and potholes and overgrazing have severely depleted wildlife habitats which once supported large populations of ungulates and game birds. Wildlife habitats are now concentrated in river-break zones and in pockets of land unsuited to agriculture. Thus, any impact of mining on these areas will be exaggerated.

If properly reclaimed, lands disturbed by mining in the Plains region can be as productive as before or put to an even higher use.

PART 5

IMPACT APPRAISAL

5.1 A NEED FOR APPRAISAL

A problem with surface mining is that the costs it imposes on others do not appear in the internal accounts of the mining company. Thus, a rational decision about the profitability of mining a particular deposit may lead to a socially undesirable result and a net loss to Alberta.

Protection of public welfare may require intervention in the market process to ensure that external costs are considered. The goal of such intervention should be the maximization of net social benefits.

5.2 BROAD COMPARISON OF BENEFITS AND COSTS

It is useful to make a distinction between values which normally occur within an accounting framework, direct benefits and costs, and those which do not, indirect benefits and costs.

5.2.1 Direct Benefits and Costs

Direct benefits to Alberta are payments to the factors of production - land, labour and capital. Royalties are paid to landowners, including the Crown, wages to labour and profits to capital. Taxes are included in the gross returns to labour and capital and cannot be considered as additional benefits.

These payments must be made to Alberta's factors of production to be counted as benefits. If out-of-province labour is employed and sends money out of Alberta, then payments to that labour do not benefit Alberta. To the extent that profits are sent out of Alberta, payments to non-resident capital

do not constitute benefits to Alberta. However, any taxes collected before these monies leave the province can be considered as benefits.

Land labour and capital are scarce resources and thus their use in any given activity forecloses their use in any other activity. When these resources are being put to their highest use in the economy, they are earning their highest possible returns or incomes. The second highest or next-best earnings for resources are known as their "opportunity-costs". Thus the direct costs of using land, labour and capital for coal mining are the opportunity costs, or earnings they could command in an alternative use.

The direct cost of using land for the removal of coal is its opportunity cost, namely the amount that would be returned to it if it were used for grazing, cereal production, forestry, etc. Another direct cost is the depreciation in land value during and subsequent to the mining operation.

In a healthy or normally productive economy, wages paid to labour and profits earned by capital will generally be equal to their opportunity costs: that is, these resources will earn little more from their use in surface coal mining than they would in any other business activity in Alberta. In general, unless the mining company proposes to use workers who would otherwise be unemployed, direct costs of labour and capital will be equal to the payments made to them. The fact that there is a certain level of unemployment at any given time does not mean that the creation of new jobs in surface coal mining is a direct benefit. We must be sure that the surface mine employs people from Alberta who actually would otherwise be unemployed and does not simply attract workers from other areas.

The creation of jobs in surface coal mining may be considered a direct benefit to Alberta under certain circumstances. This would be the case if:

- a) The government endorses and pursues a policy of economic growth and wishes to increase the population and labour force in Alberta,
- b) The government wishes to encourage and promote economic growth in certain regions of the province and this can be done through surface coal mining development,
- c) The government wishes to broaden and diversify the economic base of the province so that the economy is less sensitive to changes in any one section. However, coal mining already exists as an underground operation.

We cannot judge in advance the extent to which the government of Alberta may be committed to such goals. To the extent that they are, however, they should still be satisfied that using resources of labour and capital in coal mining will meet these goals more adequately than using the same resources for any other activity.

Similarly, the basic surface mining activity may stimulate spending in other sectors of the Alberta economy, in a "multiplier" or secondary effect. This activity should not be counted as a direct benefit per se, however, for if the resources used in surface coal mining had been used in other productive activity in Alberta, secondary activity would probably be just as great. Thus, the creation of secondary economic activity should not be measured as a benefit that would only come from coal surface mining -- such activity would probably follow from the use of labour and capital if alternative uses exist in Alberta.

If wages paid to labour and the profits earned by capital in surface coal mining are higher than could be earned in any other form of activity, the factors are said to earn economic rent, the difference between the actual return to the factor and its opportunity cost. Generally, the only factor to earn economic rent will be land. Rent accruing to landowners, including the Crown, can be calculated by subtracting the opportunity cost of the land and depreciation in land value from royalties received from surface mining operations.

5.2.2 Indirect Benefits and Costs

The only indirect benefit of importance is the provision of access to areas which were previously inaccessible. If a mine operates in an area already serviced with roads, or if mine roads do not make a significant contribution to access, then the indirect benefits do not occur. Improved access, moreover, does not always constitute a benefit.

Indirect costs result from all the side effects of surface mining operations described in Part 4.

5.3 APPRAISAL MECHANISMS

Although we can make broad comparisons between the benefits of surface coal mining in Alberta and the projected environmental consequences, we need a mechanism to judge the social desirability of any particular surface mine and to indicate the extent to which side effects should be mitigated.

5.3.1 Benefit-Cost Analysis

Benefit-cost analysis was developed, initially in river basin analysis, to appraise the efficiency of public investment projects. Given specific objectives -- i.e. flood protection and power production -- benefit-cost analysis was useful in providing choices as to the most efficient means of meeting these objectives, choosing the optimal size for given projects and in ensuring the optimal allocation of scarce financial resources among competing choices.

The analysis is really very simple. It simply provides for the logical ordering of all benefits and costs to determine "total" project feasibility. Early analyses tended to overlook ecological, recreational and aesthetic values, but these are now being taken into account.

5.3.2 Assessment of Values

In order to apply the benefit-cost analysis in an objective manner, one must be able to assess all benefits and costs in quantitative terms.

Royalties, wages and profits are relatively simple values to measure. The value of any improvement in access to commercial development may be assessed, but to assess its value for recreational pursuits is difficult. The benefits of government policies, such as regional growth and provision of employment are likewise difficult to assess.

The opportunity costs of land, labour and capital can be assessed, as can depreciation in private land values. Depreciation in Crown land values is much more difficult to calculate because there is not, typically, an open

market for Crown land. This should not be allowed to distort the decision-making framework, however, because much of the value of Crown land finds its expression in the value residents place on it for recreation.

Some of the costs resulting from such side effects of surface mining can be calculated by looking at market prices of related commodities. Others can be calculated by using indirect techniques which simulate market prices, but there remain some costs which cannot be calculated at all.

Reduced water quality may force downstream users to install costly water treatment facilities. The premature silting-up of dams can also be assessed quantitatively. Sedimentation impairs the storm-carrying capacity of streams.

The costs of increased flood damage -- destruction of crops, livestock and infrastructure and resulting reduction in land values -- should be charged to the surface mining operation. However, flood damage, landslides and damage to property caused by wind-borne dust are costs which are directly measurable only after the fact. This should not prevent their inclusion in the analysis: the potential for damage should be considered as a cost.

Other costs do not find expression in market values, but values can be calculated using indirect techniques. Recreation opportunities lost or impaired fall into this category. These costs can be calculated by recently developed economic techniques which place a monetary value on unpriced recreation. Certain ecological losses may find expression in a reduction in fees collected for hunting and fishing.

The depreciation in scenic values occasioned by a surface coal mining operation is not amendable to calculation either through substitute market values or indirect methods of evaluation. Inherent in any reclamation standards, however, is an implicit assessment of the minimum value of, among other things, scenery. Requiring a mining firm to conform to certain regulations on grading and revegetation of a mine area upon cessation of mining activities implies that the restoration of the area to some aesthetic level is worth at least the price of the restoration work. Thus, to set a minimum dollar value on scenery it is necessary only that some ameliorative standards be imposed. This does not, however, apply during the life of the operation unless screening is effective.

There are further costs which do not lend themselves to any sort of evaluation. The loss in aesthetic values from surface mining in unspoiled natural environments or in the Rocky Mountains cannot be given any realistic value.

5.3.3

Decision Making

In considering individual surface mining operations, all benefits and costs attributable thereto must be weighed to determine the desirability of proceeding with the development. Benefits must exceed costs or the factors of production are poorly allocated. If benefits are just equal to costs, the factors of production are only earning what they could earn in alternative investments.

Because of the impossibility of quantifying certain important effects and the lack of precision in assessing other values, there is no clear-cut, mathematically objective method of comparing benefits and costs. What must be done is to make a subjective decision as to whether or not the social costs and risks

are offset by the benefits. Benefit-cost analysis does not make this decision; it only provides some guidance and orders things logically. Once all of the measurable effects have been taken into account, the onus is still with the public administrator to judge whether or not the benefits also justify the immeasurable costs.

When weighing benefits and costs, he must also consider the possibility of remedial and restorative procedures and their effect on the balance. Many costs can be reduced or eliminated by applying techniques which cost less than the benefits achieved.

If there is no method of preventing undesirable social costs and these costs cannot be tolerated -- for example, extensive damage to the headwaters of the Saskatchewan River system -- then there is no alternative but to prohibit that particular operation.

5.4 RESPONSIBILITY FOR REMEDIAL MEASURES

Whenever benefits exceed costs, those who gain from the surface mining operation can afford to compensate those who lose from it. The mining company can afford to pay for remedial measures up until that point where profits are reduced to less than could be achieved in alternative investments. It should be remembered, however, that any money spent on remedial measures cannot be spent on hospitals, schools, etc.

Beyond this point of profitability, the company has three courses of action, viz. -- to increase the efficiency of its operations, to close down or to seek a reduction in royalty payments or environmental standards. The last alternative is unacceptable unless the social benefits of the operation exceed

social costs, such as might occur when subsidizing an operation to maintain employment in a rural community. If the mining company cannot operate in a situation where reclamation is necessary to balance benefits and costs, it must increase the efficiency of its operations or not operate at all.

PART 6

THE ACCEPTABILITY OF SURFACE MINING AND ASSOCIATED ACTIVITIES

6.1 BASIS FOR GUIDELINES

On a province-wide basis the area covered by operating surface coal mines is relatively insignificant. There are four surface mines in the Mountains, two in the Foothills and eighteen in the Plains. They cover estimated areas of 2, 3, and 4 square miles respectively out of a total of 248,800 for the province.

The justification for government guidance or control then lies less within total acreages than the potential significance of impact. Even a small area of disturbance will be of vital importance if bighorn sheep or Rocky Mountain goat herds are destroyed. The future intensification of watershed management in the Mountains and Foothills of Alberta will alone demand that no industrial operation be allowed to jeopardize the water resource.

The geographical extent of exploration activity is much greater than the area of actual mine disturbance. Cumulative effects will be far-reaching and of greater consequence if current exploration levels and methods are maintained or increased.

Control of surface coal mining, exploration, road building and the construction and operation of coal treatment plants and thermal electric power stations is required to ensure against irretrievable loss of vital environmental and resource values. Objectives should be the assessment of resource values that could be impaired or enhanced, the minimizing of resource use conflicts and the maximizing of benefits.

The following sections outline an optimal approach. Some of the provisions suggested are already being implemented by government agencies, but they are mentioned here in order to give an overall picture of how the impact of surface coal mining and its associated activities may be controlled and minimized.

6.2 LAND USE DETERMINATION

Solutions to resource conflicts posed by surface mining must be based upon sound land use policies and a clearly defined system of land management zones. These zones should be delineated by considering physiographic and ecological boundaries and the needs of people.

Since coal bearing sections of the Plains Region are populated, regional planning bodies will be involved. Foothills and Mountain Regions are mostly Crown lands and subject to provincial and federal control.

Certain "best use" designations have already been made in all three Regions, some of which render areas "out of bounds" to coal mining exploitation. Parks and Wilderness Areas are examples of the latter category.

"Inviolate" areas should be listed in guidelines to industry, and projected land uses for other areas made known where specific allocations have been taken and/or the parameters of policies determined.

6.3 REGULATIONS AND GUIDELINES

All industrial activity should be authorized by land use permit. This applies equally to Crown and private land. Operations on private land can affect other property owners and the general public.

Applications for land use permits will be considered by a reviewing body which should operate in a flexible manner under broad powers accorded by law. Flexibility is essential when dealing with such a wide range of conditions and needs as are found throughout Alberta.

Dialogue should be instigated whenever a mining company expresses interest in an area. The company should be able to readily find out what regulations are applicable to that area. The government should have guidelines available on request to indicate to industry the rules for permit applications, indicate what effects must be prevented and suggest general approaches to prevention.

Conditions of operation should be generally outlined on the permit with other specific considerations added by existing statutes, to which reference should be made on the permit.

Alberta must develop statutes and regulations taking note of what has happened both in the U.S.A., Canada and elsewhere throughout the world but must avoid indiscriminate use of other laws.

It has been common practice to point to the very detailed statutes and regulations which have been developed over a period of many years in parts of the U.S.A. It is fallacious to say that, because these provisions have been adjusted several times over a period of years, they are the best per se. In fact, their evolution indicates that they have become adapted very specifically to local conditions, and those conditions are very different from those found in Alberta.

Certain federal statutes must be borne in mind.

1. Canada Water Act - this deals with inter-jurisdictional waters with respect to the quantity and quality of water flowing from Alberta to the north, to Saskatchewan and to the U.S.A. Reference is made to water quality standards, the quantity and type of water that may be discharged and the treatments required.
2. Clean Air Act - this deals with federal-provincial co-operation in formulating air quality objectives and standards.
3. Fisheries Act - Section 33(2) deals with knowingly permitting the passage of any deleterious substance (any substance which would degrade, alter or form part of a process of degradation, heat being included), into any water frequented by fish.

Some provincial statutes that may apply in specific instances are:

- The Forest Reserves Act
- The Coal Mines Regulation Act
- The Fish and Wildlife Act
- The Forest and Prairie Protection Act
- The Forests Act
- The Provincial Parks Act
- The Public Health Act
- The Public Lands Act

6.4 PERMIT APPLICATIONS

Permit applications should be accompanied by a management plan. This plan will describe:

- a) the nature and extent of the industrial activity;
- b) the environmental impact of that activity;
- c) the measures to be taken to reduce that impact;
- d) the projected land use after mining; and
- e) the measures to be taken to achieve that land use.

The applicant should employ qualified personnel to prepare the plan and it should be based on adequate study.

When the permit application is received, the reviewing body should assess its feasibility and authenticity. The reviewing body should approve the application within a reasonable time, or notify the applicant in writing that it wishes to carry out or have carried out, a more detailed investigation, which may take up to six months.

Notice of intention to apply for a permit should be given in the Alberta Gazette and placed in a suitable newspaper at least two weeks before the application is submitted. This will allow members of the public and federal, provincial and municipal government agencies to make initial representations to the reviewing body.

If sufficient interest is generated by an application or resource conflicts appear highly significant, the reviewing body may instigate public hearings. Public hearings need not be held for every permit application.

Once industry, the public and other government agencies have made inputs, the reviewing body should render its decision. Terms and conditions would

be attached to approved permits and the company and government formally agree to abide by them. The management plan should form part of the covenant.

It is important that dialogue be maintained at all stages of the permit application review. If certain portions of the management plan are unclear or unacceptable, government and industry should attempt to resolve the conflict without rejecting the permit application out of hand.

6.5 INSPECTION AND MONITORING

Regular and frequent inspections should be made to ensure that all operations are according to the management plan and the permit.

Certain monitoring programs should be in the covenant as company responsibility. Examples are:

- a) a program of stream monitoring should begin before any operations are started and should be carried on throughout the life of the mine;
- b) trials should be carried out as soon as possible after operations have begun to ensure that revegetation proposals are satisfactory.

Inspectors should take note of the progress and results of those trials, the data from stream monitoring, and any unforeseen problems. If unforeseen circumstances necessitate any deviation from the management plan, the changes must be approved by the reviewing body under the same conditions for considering initial permit applications.

Performance bonds may be considered in order to ensure that the provisions of the management plan and covenant are implemented. These bonds should be subject to the following considerations:

- a) the total acreage to be disturbed;
- b) annual re-assessment considering the acreage of new disturbance and acreage satisfactorily reclaimed;
- c) the value or amount should be greater than the estimated cost of reclamation and should take into account the general inflation in the economy.

The permit would be subject to suspension and/or cancellation if conditions were not satisfied. Security of tenure should be ensured, but the right to operate made dependent upon implementing the management plan.

PART 7

RECOMMENDATIONS FOR FURTHER STUDY

7.1 SUBJECT AREAS

The following subject areas are recommended for further study:

1. Primary Statistics - A program of regular accumulation of statistics that describe the number, extent, and impact of operating mines and associated activities is required. Exploration should be monitored in the same way, and the information made public.
2. Reclamation - Although the individual mining companies will be required to carry out research and organizational trials, it will be necessary to co-ordinate reclamation research to avoid wasteful duplication of effort and to develop a fund of reclamation knowledge for Alberta. Attention should be given to obtaining reasonable estimates for reclamation costs.

All of this information should be made available in the form of a reclamation handbook.

3. Water Quality - The physical and chemical parameters of natural streams should be monitored over time to obtain quantitative estimates of the effects of surface mining and to set water quality standards.

The ecological effects of cooling water and eutrophication resulting from large fertilizer applications during reclamation should be studied to determine their application under the Alberta conditions.

4. Watersheds - Studies of surficial geology and topography should be undertaken to delimit these watersheds which are extremely susceptible to damage by any industrial activity.

At the same time, research should be carried out to develop remedial and restorative measures and methods of mining which would allow these susceptible areas to be mined without danger.

Standards should be set for the construction of exploration and haul roads.

5. Wildlife - Key winter ranges, migration routes and stop-over points should be delineated.

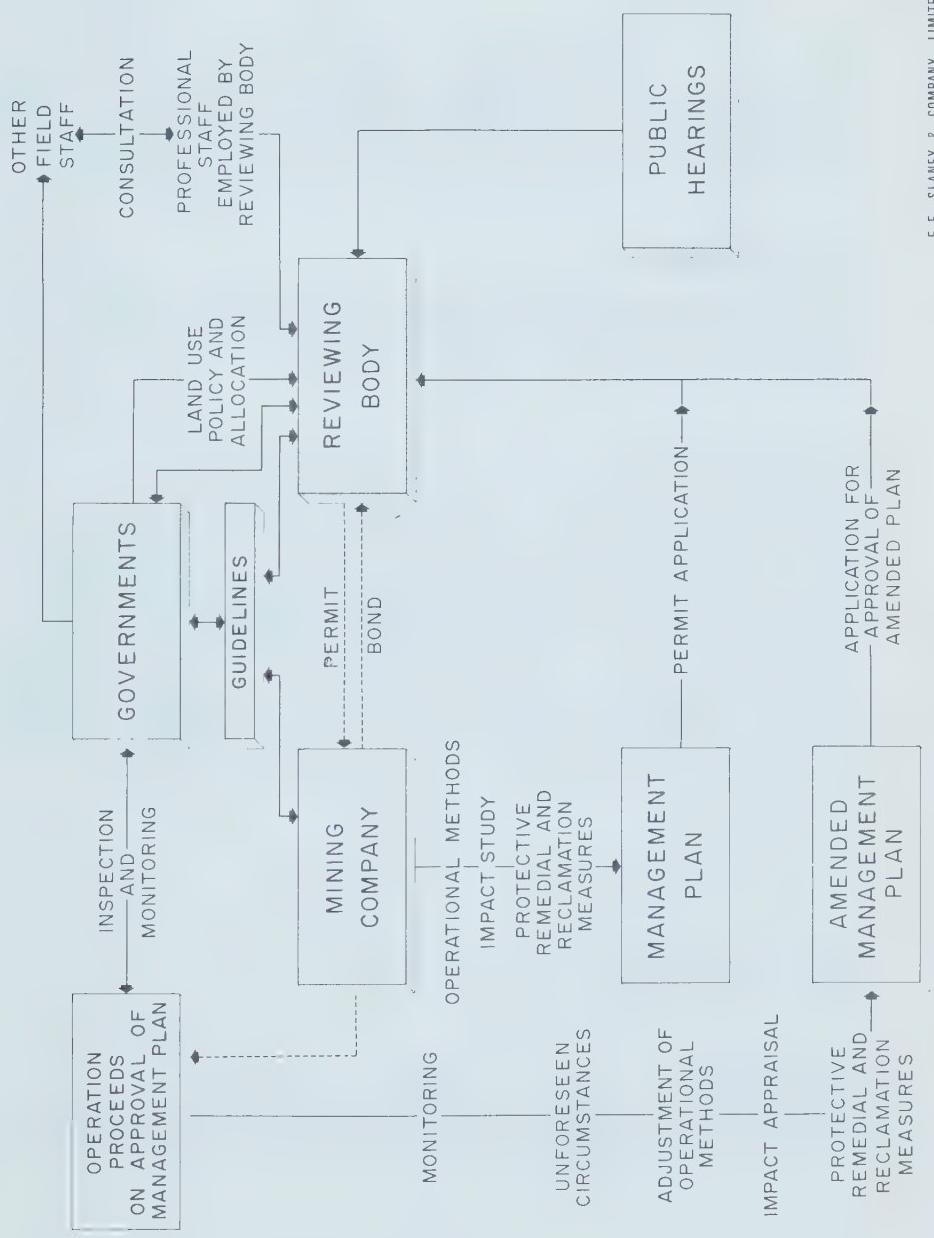
Research is necessary to develop methods of providing alternative facilities when such habitat is endangered by a surface mining operation.

6. Screening - Methods of screening mining operations should be investigated in order to maintain or improve scenic values and reduce noise levels.

7. Economic Studies - Information on the assessment of side effects should be gathered on a continuing basis. This would include a file on case studies, especially those pertaining to Alberta. This file would then provide up-to-date information which should be considered whenever decisions on surface mining are being made.

More basic information is required in order to determine the benefits of surface mining to the people of Alberta.

CONTROL OF ENVIRONMENTAL IMPACT OF SURFACE MINING



QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

You made reference to the acreage on the plains that has already been opened by strip mining practices. What is the rate at which this acreage would now be opened up per year if three million tons per year were strip mined from a six-foot or so seam?

MR. ROBERT WEBB

We mentioned that there were 1.2 billion tons of measured coal resources in the plains region. It is now being extracted at variable rates so a precise figure is difficult to come up with. Rates seem to vary from 1,000 to 10,000 tons of coal per surface acre but there can be extremes outside of that. Using these figures, between 300 to 3,000 surface acres are likely to be disturbed given the same rate of exploitation over the next few years. Basing the answer on the measured coal resources in the plains region, an additional 1,200,000 acres will be disturbed in extracting that coal. At the current rate of exploitation, which is not likely to be maintained it would take 400 years to accomplish. I think by way of general interpretation this would suggest the need for reclamation.

DR. WALTER TROST

What is the amount that has been disturbed to date?

MR. ROBERT WEBB

We estimate less than 10,000 acres.

MR. PAUL BABEY

Mr. Webb, do you have any figure on what percentage of this has been reclaimed?

MR. ROBERT WEBB

No. As far as we could determine from government and other representatives, a good usable set of statistics of this kind is not available. No one seems to be too sure as to the number of surface acres that have in fact been disturbed by surface mining in any other of these zones but particularly in the plains, much less the degree to which they have been reclaimed.

MR. PAUL BABEY

It is correct to assume that the majority of disturbances occurred in the plains?

MR. ROBERT WEBB

Yes, but not by very much. There is a relative balance now between foothills and mountains versus the plains.

DR. WALTER TROST

Confining our attention to strip mining in the prairies, how deep is it practical to go to get coal?

MR. ROBERT WEBB

This is dependent upon a number of economic factors and is best known by the coal mining operators. Perhaps they will give you the benefit of their experiences, but there are coal mines that will strip 150-200 feet of overburden in the prairies of Alberta.

FROM THE FLOOR

Mr. Webb is told that he is off in his estimation. It should be corrected to 40-60 feet average depth of overburden that is stripped.

DR. WALTER TROST

You said that all measured coal resources on the plains were potentially strippable. The word "measured" has a special meaning. I assume that there are coal resources in the prairies that are too deep to be stripped or is that not the case?

MR. ROBERT WEBB

I am sure there are, yes, but I think that the coal measured is merely what the economic climate has inspired to be measured. In other words there is probably a lot more coal within reach of surface mining that hasn't been measured to the 20% accuracy yet. It is a matter of exploration, finding it and measuring it.

DR. WALTER TROST

You made reference to the desirability of cost-benefit analysis and reaching judgements on these matters since there are always two sides to look at. In applying these methods in the prairies, is the length of time that the land is taken out of productivity and the increase or decrease in the productivity after reclamation all part of the cost-benefit analysis?

MR. ROBERT WEBB

Yes. Those are two very important considerations.

DR. WALTER TROST

Since much of the stripped coal in the prairies is used in thermo-electric installations and the electricity is consumed, the cost of the electricity is to be considered and this makes the cost-benefit analysis always subject to that quantity. In your knowledge has such a cost-benefit analysis, bearing on the rates, been done. Or have you yourself thought of that?

MR. ROBERT WEBB

We haven't. I feel sure that it hasn't been done for period situations.

DR. WALTER TROST

Can you contrast cost-benefit analysis in the prairies as against the mountains, indicating whether reclamation is feasible and what the particular difficulties may be against that feasibility in both cases?

MR. ROBERT WEBB

It is a much simpler process in the plains region simply because reclamation procedures are better known or easily put into practice at less expense. Problems in the mountains and foothills regions associated with reclamation tend to be more acute. At higher elevations, revegetation of areas above or at timberlines is in fact an extremely difficult and expensive procedure. The movement of overburden and the contouring of land preparatory to revegetation in the mountains is an extremely costly process, if in fact it can be done at all. Because these procedures are more difficult and hard to cost in advance the cost-benefit analysis approach is much harder to put into practice in the foothills and mountains.

MR. PAUL BABEY

You mentioned the potential impact that strip mining can have on watersheds particularly in the mountain region. If we direct our attention to the plains area, what about the potential impact of surface mining on water supplies, surface water, underground water and the water table?

MR. ROBERT WEBB

This is a generally unknown area that we didn't look at in detail. I would say that where surface mines occur on the edges of ravines, coulees and stream banks, there could be a local effect which could involve a farmer or have a greater impact; but this is pure speculation. As to a broad regional effect on underwater hydrology it is unlikely that an individual surface mine would have a very marked effect on a regional basis.

MR. PAUL BABEY

You mention that the chemical problems here are not as severe as they are in other parts of the world. What about strip mining in the plains area and the difficulties that one might encounter in terms of the water supplies?

MR. ROBERT WEBB

This was really beyond the scope of our study, and we recommend additional study. The chemical problems to which I refer are those that are associated with high sulphur content in soil. The sulphur content is not that high in Alberta and, therefore, the sulphur problem is not as great as it is in the eastern United States. In the mountains and foothills there may be problems of iron precipitate and alkalinity. Alkalinity problems could develop in the plains regions where the possibility of containing contaminated water is much greater. The impact upon surface water could be considerable in a local area. Alkalinity problems in the soils in the plains could develop non-reclaimed areas but could be mitigated against. These problems are of concern and definitely should be researched further.

DR. STUART SMITH

Your written report clearly indicates a multi-discipline approach to the problems we are discussing at these hearings. We have evidence from other parts of the world, particularly Germany, where this has been practised to a high degree. Do you see any difficulties in integrating the kinds of discussions from private consultants, government and industry, that will be productive in effecting good reclamation and returning the land to a state equal to or greater in value than before it was disturbed? Is it being done now? What are the prospects?

MR. ROBERT WEBB

I think the degree of cooperation between responsible government agencies and the mining companies is improving rapidly. However, there is much room for improvement. I would suggest that there are great, but not insurmountable, difficulties in bringing about this kind of approach. One of the greatest difficulties I think is the total absence of a land use plan and a good zoning policy to cover all the areas in which coal formations exist. I think this is a primary requisite and the sooner the better.

DR. STUART B. SMITH

In your opinion could certain key areas be replaced, although not exactly intact since obviously they can't be, as they were before being disturbed? If an area were disturbed and valuable game animals were eliminated or displaced, is it possible through modern range practice to replace them in some other area.

MR. ROBERT WEBB

Yes, it's a very real possibility. If properly planned and carried out, range improvements can result from reclamation programs on the site or off it. Let's cite an example, mind you this varies from species to species and from area to area, and it's more difficult to do in the case of rather stereotyped species such as bighorn sheep and mountain goats that have a certain rigid set of habitat requirements from which they usually can't break away very rapidly. However, in the case of mule deer, white tail deer, elk, to name a few of the larger and more important game animals, improvements in both food and later in cover can be obtained on an old surface mine. That is, improvements over the situation which existed before the surface mine. Some compensation can also take place through the development of food plots and food availability on areas nearby but not necessarily on the surface mine. It all depends on the kind of reclamation that takes place. Revegetation is very important. Certain grasses and legumes can be introduced onto a contoured open pit that produce more protein and thus improve the welfare of certain game animals.

THE IMPACT ON THE ENVIRONMENT OF SURFACE MINING IN ALBERTA

**PUBLIC HEARINGS
AT
GRANDE PRAIRIE**

**THE YORK HOTEL
DECEMBER 13, 1971**

**ENVIRONMENT CONSERVATION
AUTHORITY**



1.1 PEACE RIVER REGIONAL PLANNING COMMISSION
BRIEF PREPARED FOR SUBMISSION TO THE
ENVIRONMENT CONSERVATION AUTHORITY
DECEMBER 13, 1971 - GRANDE PRAIRIE, ALBERTA
PRESENTED BY GRAHAME ALLEN

MR. CHAIRMAN AND MEMBERS OF THE ENVIRONMENT CONSERVATION AUTHORITY

WITHIN THE AREA OF THE PEACE RIVER REGIONAL PLANNING COMMISSION LIES A MOUNTAINOUS AND FOOTHILL AREA INCLUDING PART OF WILLMORE WILDERNESS PARK AND THE AREA IMMEDIATELY NORTH THEREOF. THE AREA CONTAINS EXTENSIVE COAL DEPOSITS WHICH ARE ASSUMING INCREASING IMPORTANCE SINCE THE COMMENCEMENT OF STRIP AND UNDERGROUND MINING OPERATIONS IN THE VICINITY OF GRANDE CACHE.

OFFICIALS OF OUR PLANNING COMMISSION MET WITH OFFICIALS OF THE PEACE RIVER-LIARD REGIONAL DISTRICT OF BRITISH COLUMBIA IN 1970 TO DISCUSS POSSIBLE EFFECTS OF MINING OPERATIONS AND EXPLORATION, PETROLEUM AND NATURAL GAS EXPLORATION AND DEVELOPMENT AND EXTENSIVE FORESTRY OPERATIONS IN THE GENERAL AREA OF THE EAST SLOPE OF THE ROCKY MOUNTAINS. IT WAS FOUND THAT THE AREA NORTH AND WEST OF GRANDE CACHE IS VIRTUALLY UNPOPULATED, HAS LIMITED ACCESS, CONTAINS TREMENDOUS AREAS OF SCENIC BEAUTY, IS A VIRTUAL HAVEN FOR VARIOUS KINDS OF WILDLIFE, MAY POSSESS AN ALMOST UNLIMITED TOURIST AND RECREATION POTENTIAL AND LIKELY CONTAINS VAST MINERAL DEPOSITS, PETROLEUM AND NATURAL GAS RESEVOIRS AND TIMBER POTENTIAL.

IN VIEW OF THE ABOVE IT WAS DECIDED THAT A BRIEF SHOULD BE PREPARED JOINTLY BY THE PEACE RIVER -LIARD REGIONAL DISTRICT AND THE FRASER FORT-GEORGE REGIONAL DISTRICT, BOTH IN BRITISH COLUMBIA, AND THIS REGIONAL PLANNING COMMISSION FOR PRESENTATION TO MEMBERS OF THE

PROVINCIAL CABINETS IN BRITISH COLUMBIA AND ALBERTA OUTLINING OUR VIEWS IN THE MATTER.

THE JOINT BRIEF WAS PREPARED AND STYLED THE "MONKMAN-KAKWA PROPOSAL FOR RESOURCE PLANNING STUDY." IN MARCH AND MAY THE BRIEF WAS PRESENTED TO CABINET REPRESENTATIVES OF THE BRITISH COLUMBIA AND ALBERTA GOVERNMENTS RESPECTIVELY.

THE PROPOSAL SUGGESTED THAT THE PROVINCIAL GOVERNMENTS CONSIDER RESERVING AN AREA COMPRISING APPROXIMATELY 2750 SQUARE MILES IN BRITISH COLUMBIA AND 500 SQUARE MILES IN ALBERTA FOR AN EIGHTEEN MONTH PERIOD TO ALLOW FOR THE CARRYING OUT OF A RESOURCE PLANNING STUDY. THE BRIEF INDICATED THAT "THE EFFICIENT UTILIZATION OF THE RESOURCES IN THE NORTH CENTRAL PART OF BRITISH COLUMBIA WILL BE OF UTMOST IMPORTANCE IN ORDER TO ACHIEVE FULL ECONOMIC DEVELOPMENT OF THE AREA WITHOUT SACRIFICING ITS ENVIRONMENT AND SCENIC QUALITY. THE MONKMAN-KAKWA AREA OFFERS A MULTIPLICITY OF LAND USE OPPORTUNITIES, RANGING FROM MINING AND OTHER RESOURCES TO WILDLIFE AND WATERSHED PRESERVATION."

THE BRIEF GOES ON TO SUGGEST THAT "AFTER THE ----- STUDIES HAVE BEEN COMPLETED, REALISTIC BOUNDARIES FOR CORE RECREATION AREAS (PARK) COULD BE PROPOSED, TAKING INTO ACCOUNT THE HIGHEST AND THE BEST USE FOR THE VARIOUS OTHER AREAS. RECREATION AND CONSERVATION USES SHOULD BE CONSIDERED ON AN EQUAL BASIS WITH OTHER USES AND SHOULD NOT BE REGARDED AS LEFT OVER USES IN LEFT OVER SPACE."

THE RESPONSE FROM THE BRITISH COLUMBIA CABINET REPRESENTATION WAS ENCOURAGING AND IT IS UNDERSTOOD THAT STUDIES ARE CURRENTLY UNDERWAY IN BRITISH COLUMBIA THROUGH DEPARTMENTS OF GOVERNMENT AND THE REGIONAL DISTRICTS.

AT THE TIME OF THE PRESENTATION OF THE BRIEF TO REPRESENTATIVES OF THE ALBERTA CABINET IT WAS POINTED OUT THAT THE PROVINCE HAD SUBSTANTIAL COMMITMENT~~S~~ TO PETROLEUM, MINING AND FORESTRY INTERESTS IN THE STUDY AREA.

IT WAS SUGGESTED THAT THE AREA MIGHT BE STUDIED BY THE SAME GROUP CURRENTLY CARRYING OUT THE FOOTHILLS RESOURCE ALLOCATION STUDY. LATER THIS COMMISSION RECEIVED A LETTER FROM H. W. THIESSEN, DIRECTOR OF THE INTERDEPARTMENTAL PLANNING DIVISION, DEPARTMENT OF THE ENVIRONMENT, INDICATING THAT THE PROVINCE HAD ACCEPTED THE MONKMAN-KAKWA RESOURCE ALLOCATION PROPOSAL AND THAT A STUDY SIMILAR TO THE FOOTHILLS RESOURCE ALLOCATION STUDY WOULD BE UNDERTAKEN IN THE AREA, COMMENCING MID 1972.

HOPEFULLY THE STUDY CAN BE UNDERTAKEN, ITS RESULTS ANALIZED, RECOMMENDATIONS MADE AND CONCLUSIONS IMPLEMENTED BEFORE SUBSTANTIAL DAMAGE RESULTS TO THE AREA THROUGH EXPLORATION AND DEVELOPMENT ACTIVITIES.

OUR COMMISSION MEMBERS REALIZE THAT IT IS TO THE ADVANTAGE OF ALL CITIZENS OF ALBERTA TO DEVELOP THE RESOURCES OF THIS AREA HOWEVER, IT IS STRONGLY FELT THAT DEVELOPMENT MUST OCCUR IN A MANNER THAT THIS LAST REMAINING VIRGIN MOUNTAIN AND FOOTHILL AREA DOES NOT BECOME AN AREA OF DESOLATION THAT FUTURE GENERATIONS CANNOT ENJOY.

IT IS MOST GRATIFYING TO OUR COMMISSION TO SEE THE INTEREST AND DEGREE OF CONCERN OF OUR NEIGHBORS IN BRITISH COLUMBIA IN THE MATTER OF PRESERVING THE ENVIRONMENT IN THEIR PROVINCE. AS THE HEADWATERS OF MANY OF THE TRIBUTARIES OF THE WAPITI-SMOKEY RIVER SYSTEM ARE LOCATED IN BRITISH COLUMBIA, IT IS CONSIDERABLY IMPORTANT TO OUR REGION THAT THESE WATER COURSES BE PROTECTED.

WE WOULD SUGGEST TO YOUR AUTHORITY THAT YOU USE YOUR GOOD OFFICES TO ENCOURAGE THE PROVINCE OF BRITISH COLUMBIA TO TAKE APPROPRIATE MEASURES TO ENSURE THAT WATER COURSES ORIGINATING IN THAT PROVINCE AND FLOWING INTO ALBERTA ARE NOT ENDANGERED.

WE WOULD LIKE TO THANK YOUR AUTHORITY FOR THIS OPPORTUNITY TO PRESENT OUR COMMISSIONS VIEWS TO YOU AND WE ARE CERTAIN THAT AS A RESULT OF YOUR AUTHORITY'S ENDEAVORS THAT ALBERTANS IN YEARS TO COME WILL STILL BE IN A POSITION TO BE JUSTLY PROUD OF THEIR PROVINCE.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

Thanks very much Mr. Allen. You emphasized the joint planning, or joint studies that have been done between Alberta and British Columbia leading to the presentation of a brief to the governments of the two provinces, and I was wondering if there is continuing joint activity now that the brief has been presented?

MR. GRAHAME ALLEN

Yes, we still have communication with the people in Dawson Creek. As a matter of fact, Mr. Holluraus, the Director of Planning from the Peace River-Liard Region, is here today and very interested in this hearing, so there is still the interaction going on.

DR. WALTER TROST

Then you feel that your problems are very similar problems even though there may be a border between them?

MR. GRAHAME ALLEN

This is correct, yes.

DR. WALTER TROST

Do you want to summarize for us the principal points of concern that the planning commissions on both sides of the border have in the matter? I know it is done in the brief but would you put them before us in summary form.

MR. GRAHAME ALLEN

The principle points of concern are that if joint land uses are going to occur in this particular area, in other words, if we are going to have mining industry taking place down there, we feel that it must be done in such a way so as not to interfere with the social, recreational and wildlife potential of the area. We have spoken to people involved in industry and they tell us that this can be done. We're not expert on it but we want to make sure that if something is going to happen down here that it will be on a jointly controlled basis. You see, what is happening, we have the rules and regulations I believe in Alberta, for reclamation, but the game isn't being played the way some of the rules state by some of the people, as you can see by these photographs here.

1.2 PROCTOR AND GAMBLE CELLULOSE, LTD.

A SUBMISSION ON

THE ENVIRONMENTAL IMPACT OF SURFACE MINING IN ALBERTA

PRESENTED BY DAVID D. SCHORES

My name is David D. Schores and I represent Procter & Gamble, Ltd., located here in Grande Prairie. Procter & Gamble is presently constructing a pulp mill south of Grande Prairie and has an interest in Coal Exploration and Mining activity by virtue of its Forest Management Agreement with the Province of Alberta. Through this Agreement, Procter & Gamble, in conjunction with the Department of Lands & Forests, has the responsibility of managing a sizeable portion of the forest resource in the vicinity of Grande Prairie. This is a responsibility that we take very seriously and is the reason for my being here today.

While our Forest Management Agreement with the Government of Alberta states that the primary use of the Forest Management Area shall be for the growing and harvesting of timber, we believe in multiple use of the forest with proper and orderly development of other natural resources, which include soil, water, wild-life, recreational and aesthetic values as well as timber, so as to provide a continuous supply of timber from the forest and maintain other forest values.

Even though, we firmly believe in multiple use, we recognize that there are areas in which the recreational or aesthetic values so far out-weigh any other uses, that they should be set aside for limited use. In co-operation with the Department of Lands & Forest, Procter & Gamble has set aside over 11,000 acres in the following locations for recreational and aesthetic purposes:

1. Musreau Lake
2. Economy Lake
3. Nose Lake
4. Cutbank River
5. Pinto Creek
6. Shuttler Flats
7. Kakwa Falls
8. Two Lakes

My purpose in being here today is to express our general concern over potential damage through mining exploration to the areas we have set aside for recreation and aesthetic purposes. We are specifically concerned at this time over Kakwa Falls and Two Lakes areas. While we have set aside over 2,700 acres to be left in its natural state around the Kakwa Falls and over 3,800 acres at Two Lakes for recreational development, these areas are still subject to mining and all types of exploration. Once exploration lines, roads or trenches are cut through a natural or recreational area, a considerable portion of their value is lost.

We therefore, suggest that any mining problem, exploration, or other activity that disturbs the land surface or vegetation be excluded from these areas until current government studies underway are concluded.

Our second concern is over the regulations governing geophysical exploration. As they now stand, there is relatively little a forest management holder can do about exploration. Sometimes we are informed that exploration is taking place but we have no voice in where it is done, how it is done, or how much damage is done. We therefore, suggest that we be given the opportunity to provide our input into such matters which should provide for effective forest resource management and better co-ordinate the use of all resources

in the areas concerned. Prior notification would not be for the purpose of impeding proper development into the utilization of these mineral resources but rather to properly co-ordinate those efforts with the total resource management of the entire area.

Thank you for the opportunity to present this submission on behalf of Procter & Gamble Cellulose, Ltd.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

You made reference to the Kakwa Falls and Two Lakes as areas in which Proctor and Gamble had, as I understood you, roughly given up their forest utilization rights.

MR. DAVID D. SCHORES

That is correct, we worked out these areas in conjunction with the Department of Lands and Forests.

DR. WALTER TROST

However, they are still subject to exploration for other resources and for surface mining?

MR. DAVID D. SCHORES

As far as we understand that is correct.

DR. WALTER TROST

Are such activities going on now?

MR. DAVID D. SCHORES

To our knowledge there are such activities in the Kakwa Falls region.

DR. WALTER TROST

In the area that you had arranged with the provincial Department of Lands and Forests to revert to provincial park status?

MR. DAVID D. SCHORES

That is correct.

DR. WALTER TROST

Are there noticeable results of this development or exploration?

MR. DAVID D. SCHORES

I don't have any specifics in mind other than that there are camp locations, a drilling rig, and roads have been built in the area, some of which are quite close to Kakwa Falls and this disturbs us. We do not think it proper that it be excluded from one resource development, in fact from a resource development which is renewable, yet be allowed to develop other non-renewable resources.

DR. WALTER TROST

Now the second question I would like to follow up was your description of how multiple resource developments have impact on each other and I was wondering if you would indicate the nature of the impact on forest utilization of strip mining.

MR. DAVID D. SCHORES

There are several impacts. The first of which is the removal of certain of the areas from productivity. The amount of volume and productivity of forest management area is of grave concern to us for long range and thus any area removed is land taken out of timber productivity. There isn't an immediate loss of timber, if there is any timber this is aside from productivity, but there is a loss of timber that is present on it which may or may not be mature or may not be ready to harvest under proper forest management. Those are the two primary concerns for us. We have a tertiary concern and that is the development of too many roads into an area, the uneconomic development of parallel roads. These are some of the areas into which we could coordinate the efforts of ourselves and mining activity.

DR. WALTER TROST

So you feel that some of your problems could be handled by a proper cooperation between the various resource development operations?

MR. DAVID D. SCHORES

That is correct. On the areas that are not already withdrawn from our area for recreational purposes, we feel those activities ought to be curtailed. Throughout our forestry management area we feel that proper resource coordination could be obtained. We are working directly with a number of the oil exploration companies and have found a great deal of cooperation with these companies in this regard. We have not found the same with the coal companies.

DR. WALTER TROST

Now the oil and gas people have been operating for some time and coal is to some extent a newer development or developing more rapidly recently. Is it just a matter of not having sufficient time to develop cooperation or is there something more intrinsic involved?

MR. DAVID D. SCHORES

I think it's probably a matter of time in developing the proper regulations and coordination with the government agencies. I see no reason why these cannot be developed and coordinated. We have not been too successful thus far in getting it coordinated.

DR. WALTER TROST

The lands on which you practise forest management, are these mostly in the foothills, in the mountains, in the plains, or a mixture of them all?

MR. DAVID D. SCHORES

They stretch from Grande Prairie into the foothills, through the foothills to the edge of the Willmore Wilderness Park so they encompass the foothills primarily but take up a bit on the plain from here all the way through to the foothills.

DR. WALTER TROST

So your problems are mostly associated with the second category, strip mining in the foothills?

MR. DAVID D. SCHORES

That is correct.

DR. WALTER TROST

Would you feel that there would be any difference in the nature of the impact on forest management in other areas?

MR. DAVID D. SCHORES

I don't know whether I'm qualified to answer that question in terms of forest management on the plains regions. Is that what you are suggesting? I think that in viewing the resources of Alberta, the primary forest management productivity lies in the foothills and thus I think that is of the greatest concern to the forest industry.

MR. PAUL BABEY

This question might be premature but I was wondering, have you looked, on the basis of your lease and the potential for forest management in your area, to what the productivity might be some time from now?

MR. DAVID D. SCHORES

We have done a great deal of looking into this and rely on the figures of the Alberta Forest Service which, by the very nature in which they were taken, were rather gross figures. They were not meant to be accurate and thus we cannot put a great deal of reliance on them. We are in the process of obtaining some very accurate surveys of our own so that we can better assess it. We have indeed looked at it and a primary concern of a forest resource manager is that the drain from the forest is equal to or less than the growth potential. If this drain takes on the natural drain of fire, insects, diseases and the man-made drain of harvesting operations. We can judge the man-made drain fairly well and we can regulate that. The regulation of the natural drain is a good deal more difficult. We do know that our forest management area is certainly not over-abundant with potential. We are concerned that there is not sufficient growth potential for the doubling of the pulp mill as laid out in the forest management agreement. So we do have a grave concern over its total productivity.

DR. STUART B. SMITH

Mr. Schores, your decision to, as I understand it, voluntarily excise these areas for recreation - could you give us some idea of the productivity of the woodlands in those areas, are they good productive woodlands generally in terms of timber.

MR. DAVID D. SCHORES

In terms of the 11,000 acres which we did voluntarily exclude from our forest management area, in the main these are highly productive lands. A flight over the Kakwa Falls or the Two Lakes region is an example and those are probably the two largest, Musro Lake is probably about as large. Those three actually comprise about 9,000 acres of the total 11,000 acres that was withdrawn. All those three areas are highly productive timbered acres.

DR. STUART B. SMITH

Your company then, sees another value that must be equally as valuable to the people around there as the extraction process of forest products by setting those areas aside?

MR. DAVID D. SCHORES

That is correct. We are endeavoring to try to be a good corporate citizen in a number of areas and not simply try and make a dollar though, obviously we have to make a profit, but we feel that there are certain areas of such significant scenic value that they are worth more as recreational areas or as small wilderness areas than they are as a productive timber management unit. This is not to say that the rest of our entire forest management agreement area is not open for other recreational uses and multiple uses but these certain specific areas we feel are worth more simply as an undisturbed recreation area.

DR. WALTER TROST

You have shown where difficulties are created for forest management by the presence of other resource developers. Can you think of difficulties that you create in utilizing the forests that then affect the coal operator?

MR. DAVID D. SCHORES

I would suspect that probably the most difficult situation that could develop in terms of us doing something that would affect them might be in the matter of economics. For instance, we might without proper coordination, reforest an area after we've harvested the timber, only to find that the coal company the next year or two, came in and strip mined the area, thus having to pay us for the damage to the reforestation work that we did. With proper coordination I can see virtually no problem that we could create to their area. Primarily their area is relatively small in size as compared with the total forest management area.

DR. WALTER TROST

If there were reclamation requirements for strip mining operations in your own managed area, what kind of reclamation would you think would be desirable from your point of view?

MR. DAVID D. SCHORES

There are a number of reclamation projects that I think would be pertinent and possible. Of course in areas that would be re-established in timber, these should be done. I think what would be as much or of even more importance would be reclamation and the recognition of the watershed protection of the particular area. Our pulp mill would be a large user of water from the Wapiti River system and thus, we are quite concerned with quality of water. I think that the water resource protection and the reforestation work are certainly two prime concerns for us.

DR. WALTER TROST

On the reforestation part, would it be simplest, again from your point of view, that the reforestation was done under the auspices of the forest management operator?

MR. DAVID D. SCHORES

It would certainly have to be done with the approval of the Department of Lands and Forests who actually approve our reforestation work. Whether the company simply paid us to do it, or paid the forest service or some other arrangement, this could be worked out. It would have to be done to proper forest management standards certainly.

DR. WALTER TROST

But you place the watershed protection in first priority?

MR. DAVID D. SCHORES

I would say it would depend on the size of the coal development. A rather significant coal development could have impact even greater in the area of forest productivity, but assuming that they aren't of major proportions, then water quality would then have to rank first.

A POSITION PAPER BY:
THE CONSERVATION SOCIETY WILD KAKWA
PRESENTED BY MR. JIM BRAKENBURY

INTRODUCTION:

WILD KAKWA is a conservation society dedicated to the preservation, specifically, of the Kakwa Falls region centering on Township 59, Range 13, West of the 6th Meridian.

More generally, however, our growing membership is concerned with strengthening the concept that selected wilderness areas within our province are, by their very existence, valuable natural resources.

We submit, moreover, that wilderness is, to a large degree, a non-renewable resource. Once subjected to the scarring vehicles and tools of our highly-mechanized society, a wilderness virtually ceases to exist; what remains is not wilderness but a clearly indicated portion of man's domain.

In this world of rapidly developing technology and much-expanded leisure time for the individual, we believe protection of wilderness regions for their recreational and aesthetic values to be of far greater importance in the long term than destruction of that wilderness for the relatively short-term advantage to the mining or petroleum industry.

It is the intent of this submission to look both at surface mining in general and at the specific threats offered to the Kakwa Falls region by this most questionable resource extraction procedure.

The example set by mining operations in the United States would suggest that surface mining in mountainous regions is nothing short of ecological idiocy. Proper reclamation is virtually impossible in economic terms and long-range environmental damage almost certain.

1. WATERSHED PROTECTION:

Alberta's envious position in a world increasingly threatened by the reduction of fresh water must be noted.

"About 10,500 miles of once-clear Appalachian streams are contaminated by acids, sediments and minerals draining from exposed coal beds." (Time, Mar. 22/71. pp. 60)

"A 1955-59 study by state and federal agencies compared two adjacent watersheds in eastern Kentucky. The valley that remained in timber yielded 27.9 tons of silt per square mile annually. The other, which had been 'disturbed by stripping', flooded its silt basins with 30,000 tons of acid-reddened mud from each square mile!" (The Nation, April 1971, pp. 489.)

In this world, any government allowing such destruction to the remaining supply of fresh water is virtually guilty of a crime against humanity.

The Kakwa region is a major supplier of clean, pure water to the Peace River watershed, one of the province's major sources of fresh water.

We would submit there is not sufficient knowledge of water pollution effects on the global scale to justify further risks to our steadily-diminishing supply of fresh water.

2. SCIL EROSION AND SILTATION:

Here again the United States provides conclusive evidence that strip mining in mountainous regions can be done only at unjustifiable expense to the environment.

.....

"Strip mining may be one of the most grossly destructive practices of modern technology. Forested hillsides are torn away. More level lands are furrowed with great gullies and accompanying mounds of denuded and sterile soil. Masses of silt and acids from the eroded mines enter waterways. Wildlife habitats are destroyed, fish are killed by acid-mine drainage and...tax bases are depleted after the strip miners pack up and go on to the next site." (Science News, May 1/71, pp. 297.)

Soil erosion problems are an integral part of any strip mining development, or for that matter a part of any development, be it a road, railway or bush trail, where natural defences against erosion are tampered with by man.

On the prairies, the problem is alleviated somewhat by the relative ease of reclamation -- with particular reference to the time element involved.

Mountainous regions, however, have a substantially fragile ecological balance with proportionately fragile erosion controls. Here again, the unfortunate bunglings of United States mining concerns and governments clearly indicate the impossibility of adequate or economical reclamation procedures in mountain regions.

"The actual reclamation effort should begin as soon as possible after mining because the material is fresh and easier to handle. The mines should first be graded back to their original contour. Then the area can be fertilized and seeded with grasses and legumes...The cost of such a plan would be around \$500 to \$1,000 per acre if carried out immediately after mining, and nearer to \$1,600 later..." (Science Week, May 1/71. pp. 289)

...

It must be noted that the area of concern discussed is the Appalachian Mountains in Virginia. The cost of a similar scheme -- if it is at all possible -- would be significantly higher in the substantially larger and steeper Rocky Mountains of Alberta. This estimate did not include, moreover, the possible costs of a major reforestation program.

One reclamation project mentioned in Newsweek, June 28/77 on page 70, involved an expenditure of \$130,000 for a 155-acre park. This massive expenditure appears a noble effort unless it is noted that the project included a lake within the park -- a lake so poisoned it was useable neither for fishing nor swimming.

We believe that a decent job of reclamation in the Kakwa region, for instance, could not be done for less than this figure, which approximates \$9,000 per acre. It seems unlikely any corporation would attempt to mine the region if faced with this kind of a reclamation price-tag, but should such an attempt be made, it would present government the task of ensuring proper reclamation with no regard to the costs involved.

It appears obvious from American experiences that no surface mining project in a distinctly mountainous environment can be successfully reclaimed. Erosion, alteration of water tables and general damage to the watershed are inherent aspects of surface mining and are guaranteed. Reclamation in the true sense cannot be guaranteed.

Man has yet to prove himself capable of duplicating the delicate ecosystems so abundant in nature. The infinite variety of life in an alpine meadow cannot be replaced by a seeding of grass and the meagre result properly termed "reclamation."

...

On the prairies, and to a limited degree in the foothills, reclamation may be possible, if expensive. In the mountains, however, we submit the economic difficulties and sheer physical impossibility of such proposals should be obvious enough to limit any suggestion of surface mining.

We submit the time element to be highly crucial in any reclamation project. Erosion of soils and acids and damage to a region's water table can be prevented only by having the topsoil immediately replaced, reseeded and properly contoured. Extremes of weather could have serious effects on the proper staging of any reclamation program in this province.

RECOMMENDATIONS

1. In any legislation pertaining to surface mining, the term "reclamation" should be defined as "the re-creation of the environment to the state it was in prior to the start of any surface mining or mining exploration."
2. Prior to the commencement of any exploration or mining operation, a thorough and specific study should be made to determine the possibility of reclamation, the capabilities of the company responsible for that reclamation and the costs involved.
3. No surface mining should be allowed to proceed faster than the reclamation of the area being developed. If at any time it is determined that reclamation is not accomplishing the purposes outlined in recommendation (1.), mine development should be halted until the reclamation is judged to be of sufficient and adequate standard.

4. We would submit that companies which have maintained control of leases where reclamation is required should be forced to complete these reclamation procedures prior to renewing the development of these areas.
5. Prior to the actual development of any mine -- and in fact prior to the granting of specific mining permits -- public hearings into the matter should be held in relevant areas of population.
6. Detailed plans for such development should be available to the public at regional government offices so interested citizens may aid in ensuring all possible co-ordination of activities in an area and avoidance of duplication of roads and other services.
7. In all areas where the recreational values are of significance, priority shall be given to the maintenance of these values, since these values could be significant as a renewable or at least a re-useable resource, but once coal or oil is gone it is forever irreplaceable.

SPECIFIC RECOMMENDATIONS FOR PROTECTION OF THE KAKWA REGION

1. It is our submission that the recreational and aesthetic values of this area far outweigh any commercial values, particularly those which result in destruction of the region's natural beauty. We suggest that surface mining in this region is a serious threat to the ecology and would result in irreparable damage.

2. Reclamation of this scenic region -- even reclamation of the damage already done by exploration crews -- is in our opinion a physical impossibility, if we consider a definition of "reclamation" as outlined in our first general recommendation.
3. The importance of the Kakwa region as it relates to the Peace River watershed would make any attempt at surface mining in the region an experiment the people of this province can ill afford. Over the long term, pure water is surely more important than coal.

In conclusion, let us look once again southward to the devastation so evident in the United States. There, surface mining and its inherent dangers have been proven destroyers of the environment and the economy. Areas of the United States blighted by surface mining have been likened to the "craters and landscape of the moon."

The moon is a dead planet; we don't want one here.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

I know that you quoted material from United States publications because work has been done there but have you knowledge of your own, or your group, about problems of this sort that are now occurring in our own region here? I am thinking of soil erosions, siltation problems and so on.

MR. JIM BRACKENBURY

In the research that we attempted to do for the background on this, we did not come across written evidence of a local nature which we much agree would have been considerably preferable to references to the U.S. I guess one of the conclusions we drew is that not as much exploration and development and mining have been done in Alberta so we are in a position to prevent some of these problems before they get started but we don't have the evidence.

DR. WALTER TROST

Your presentation indicates that if good management practices can be used, and you have given a series of recommendations, then your position on resource development particularly strip mining, is as listed in your recommendations.

MR. JIM BRACKENBURY

That is correct. Our general stand on strip mining is that under the conditions we have suggested, it may very well be viable subject to the proper study. The first speaker mentioned some of the homework that has to be done first. However, on the basis of the people involved in our organization and their work; and leisure and recreation in the Kakwa Falls area, we are skeptical that it should ever be opened up for strip mining. However, the whole area has been virtually leased out for exploration.

DR. WALTER TROST

It seems to me that the area of your deepest concern was the difficulty or the fragility in mountain mining when done by strip mining purposes. What would your reaction be to underground mining there?

MR. JIM BRACKENBURY

That would be an excellent subject for study. This should be considered as an alternative and weigh the two forms of mining against their consequences.

DR. WALTER TROST

Now, returning to the Kakwa Region, you feel that there is some part of that area that you would like to have reserved from resource developments, at least of certain kinds. Is that right?

MR. JIM BRACKENBURY

That is right. Wild Kakwa proposals for the region call for a wilderness area under the Wilderness Areas Act in the area between Kakwa River which has the two sets of falls on it, and the South Kakwa River and then bordering on the Alberta - B.C. border and Willmore Wilderness Park. That is about two and one-half townships. Another 15 to 20 townships in a sort of circumference around that, we would call a restricted development area. We are in the process of submitting petitions and briefs along those lines to the government.

DR. WALTER TROST

These areas that want as a wilderness area or a restricted access area, do they happen to be endowed with the resources of these sorts, and if so, which kinds?

MR. JIM BRACKENBURY

Mr. Schores has pointed out that that area is quite valuable to them in terms of forest resources. It is quite apparent that there is oil and coal in that area. That is from folklore and the evidence of the exploration activity. The experts seem to think that resources are there.

DR. WALTER TROST

In your restricted access area, which in your description was the larger part of the area in the Kakwa Region, would this area be accessible to resource development under proper management principles?

MR. JIM BRACKENBURY

I think that it would, and under very careful coordination. With reference to Mr. Schores' comments about road developments, one of the submissions of our brief was to call for a development coordinating authority which would be

specifically looking at that area and handling those kinds of problems. In the restricted development belt, we would see a certain amount of industrial development.

MR. PAUL BABEY

You stressed the time element as being very important in terms of reclamation and the actual mining operation. Have you any thoughts on how the time element may be cut down?

MR. JIM BRACKENBURY

I suppose only strip in a season what you can reclaim in a season. We are worried about the stripping activities taking place and then snow fall in the winter and rains in the spring, and the subsequent run-off losing a lot of topsoil and causing damage to the water table. We would like very small scale operations taking place in the summer with reclamation in the fall. That is a personal comment.

MR. PAUL BABEY

You mentioned a figure, something around \$9,000.00 for reclamation per acre in the Kakwa area. Has there been some studies done on this, or are you basing this partly on the kind of experiences that the United States has had in similar circumstances?

MR. JIM BRACKENBURY

Clearly, we are basing this on American experiences where in our judgment, the problems presented would not be as serious, as we submit they would be in our particular area. They do not have the slopes and all this kind of problem that we have here.

1.4

Submission to the Alberta
Environment Conservation Authority
UNIFARM REGION 1

Presented at: Grande Prairie, Alta.
December 13, 1971.

Gentlemen:

It is my pleasure, on behalf of Region 1 of Unifarm, to have this opportunity to express our support for a wilderness area in the Kakwa Falls region. Rural and urban people of this province have the need, and appreciate opportunities for relaxation.

For those who enjoy the great outdoors and a close association with nature - what could be more rewarding than having the opportunity of visiting, and enjoying a wilderness area, unscarred by commercial development, having the view of snow-capped mountains, clear streams and the beautiful Kakwa Falls.

At our Region 1 Unifarm Convention, held in Grande Prairie, June 24, 1971, a resolution was passed indicating support for the Wild Kakwa Association, to save a wilderness area.

A letter was forwarded to your office following our convention. It is my pleasure to now re-indicate this support.

Respectfully submitted,

Melvin C. Longson,
Unifarm Director,
Region 1.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

Are you also supporting the concept that Mr. Brackenbury presented to us now, of a restricted area around the wilderness area?

MR. MELVIN LONGSON

Yes, I think we would support this. I feel that there should be some development in the area not quite adjacent to the falls. We are very concerned about this particular area too and we would like to see it based on some experience before the immediate area was opened up.

DR. STUART SMITH

In most of the writing and speaking we hear about recreation. Generally people are talking about city people, it seems to me they forget about the farm people. What is your general impression of the importance of these areas for farm people as compared to city people to whom we know it is important. I'd like you to express some opinion representing a farm group.

MR. MELVIN LONGSON

You must appreciate the fact that farm people work with nature and I think they have a great appreciation for it. I've talked to a number of our farmers that have travelled into the Kakwa Falls Region and they are really impressed. They really appreciate this. I think that you would find this with 90% of the farmers, they have a deep appreciation for nature and wilderness areas in particular. I wouldn't want to say that they appreciate any more than the urban people but there is a deep concern.

A BRIEF TO THE ENVIRONMENT CONSERVATION AUTHORITY
PRESENTED BY WAPITI FISH AND GAME ASSOCIATION

GENERAL COMMENTS

Surface mining activities can be expected to expand rapidly in the coming years.

Some damage from surface mining is inevitable even with the best mining and restoration methods, but much can be done to prevent excessive damage, and to reclaim mined lands.

Elementary principles of resource management dictate that our Province of Alberta put a stop to unnecessary damage from future and present mining operations and begin to repair past mistakes and damage. Ravages of unreclaimed surface mining affect all resource values: That is forests, land, fish and wildlife, water and natural beauty.

Surface mined areas unless graded, leveled and controlled and stabilized can cause severe erosion or landslides.

It has been up to the present time an accepted policy to mine an area as cheaply as possible and to provide the greatest profit to the producer.

This short term outlook has ignored the long term cost: - Silted and acid laden streams and ponds and countless acres of derelict, unproductive land.

The industrial power that enables the planning and equipment to strip our land should also be able to repair this land and even improve it for future use.

Surface mining is usually considered to consist of site preparation - clearing, etc. removal of overburden, excavation and loading of mineral or resource, finally, transportation to market. Reclamation is seldom considered as part of the mining cycle.

If reclamation, as it should be, is integrated into the mining cycle costs should be cheaper, because the machinery used in the mining operation can also be used, on the spot, in reclamation.

We Recommend

1. That the Provincial Government establish standards and reclamation requirements for all surface resources and surface mined areas regardless of ownership.
2. That the Provincial Government enact and enforce regulations to provide that the cost of reclamation of mined lands be put upon the developers and not fall back as a public expense.
3. That the Provincial Government enact and enforce regulations to prevent, control or alleviate hidden effects or residue deposits that can in the future defile our fresh water streams.
4. That the Provincial Government enact and enforce time limits for reclamation. Basically reclamation should be done in co-ordination with the mining operations.
5. Performance Bonds be demanded of sufficient size as to be effective.

6. Establish an adequate inspection staff with power to stop operations if pollution threatens an area or stream system, without proper safeguards.
7. Prohibit surface mining that will effect major scenic areas - eg. Kakwa Falls, etc.
8. Reclamation of past mined areas be demanded, and if necessary taken over by our Provincial Parks.
9. Adequate Roads must be built into new mining areas before development can begin. These roads should be built of more or less permanent nature by the developer and kept in condition and open to the public for access to fishing and hunting areas, lakes and streams, as well as for inspection. This need not be an impediment on the development work but will assure access for Government inspectors and be good Public Relations with interested groups.

The forest reserve areas do belong to the public through the government and these lands should not be barred from the public by anyone.

QUESTIONING BY THE AUTHORITY

DR. STUART SMITH

There are a large number of miles of exploration roads in the mountain areas to the south and west of here and I wonder what your observation has been, as a person who presumably uses the mountains, on the effect of these roads on streams and in general on the countryside?

MR. H.E. BAYLY

It gives access to these different areas for fishing and lets people get into country that they normally would not see. Occasionally, roads are closed because of weather and many a time if they were built of higher standard and maintained, they could be used in all weather by all people for camping, fishing, hunting and just scenic travel.

DR. STUART SMITH

What you are suggesting is that where it is necessary to build exploration roads, these be built to a standard which allow more than one use.

MR. H.E. BAYLY

More or less permanent instead of a bunch of come-and-go roads.

MR. PAUL BABEY

In your 5th recommendation, Mr. Bayly, you suggest a performance bond of sufficient size. I was wondering whether you have given some thought to what the performance bond should be based on. Were your thoughts in terms of per acre, per ton of coal mined, percentage of reclamation costs or have you given thought to this?

MR. H.E. BAYLY

We're thinking of the idea that if one project had maybe a performance bond of \$10,000.00, and the job of reclaiming was probably a \$100,000.00 cost. The people involved, the mining outfit, in some cases, would say it is not worth reclaiming. Then they would fall back, they would forfeit a small bond and they would have no worry about repairing it. It should be big enough that they would be forced to carry through the reclamation work.

MR. PAUL BABEY

Are you suggesting that the performance bond perhaps be something close to what the reclamation cost might be?

MR. H.E. BAYLY

Very similar, yes.

DR. WALTER TROST

In respect of your third recommendation, that the provincial government enact and enforce regulations to prevent, control, or alleviate hidden effects or residue deposits that can in the future defile our fresh water streams. Have you any specific hidden effects that you wish to draw our attention to?

MR. H.E. BAYLY

In the Eastern United States in a lot of their strip mines, acids and various types of chemicals have come into the water from coal mines years after they were stripped. This has destroyed things completely.

BRIEF PRESENTED BY MR. A.S. ROMANCHUK
ON BEHALF OF THE LIBERAL PARTY IN ALBERTA

The Liberal Party in Alberta endorses the principle of conservation and preservation of the environment for the benefit of present and future Albertans. In support of this brief is submitted the brief submitted to the Government of Alberta in April 1969 by the Society For Pollution and Environmental Control of Calgary. No doubt the writers of that brief will make further representations to the Environment Conservation Authority when the hearings are held in Calgary.

As a further introduction to this brief The Liberal Party in Alberta generally concurs with the stand and recommendations of Wild Kakwa and the basic recommendations contained in the commissioned report of F.F. Slany & Co. Ltd. to the Environment Conservation Authority. The Environment Conservation Authority will doubtless receive many briefs outlining the acological damage done by coal mining and other companies in Alberta, and therefore this brief will be confined to specific recommendations which we trust will be taken into consideration in implementing new legislation in Alberta.

As the majority of Canada's coal deposits lie in Alberta and because of the increased activity in coal mining, it is reasonable to assume that this activity will continue to increase and devastation of our scenic wonderland will also increase unless brought under control by the Alberta Government. It is our submission that the government implement a new act which may be conveniently styled "The Land Use Act" which will apply to the entire province. It will deal with the preservation of our land, the reclamation of land and the bounding thereof of all reclamation proposals.

Specifically, the new Act:

(a) Would be administered by the Department of the Environment.

(b) Would set up a new Council replacing the Surface Reclamation Council set up under the Surface Reclamation Act, and the appointments made to it by the Minister of the Environment.

(c) Would apply to all coal, oil and exploration companies.

(d) Would require that before any mining or exploration permit is granted the operator must first file a blue print of development showing:

(i) Cost-benefit analysis of the development;

(ii) All the uses to which the land is and may be put;

(iii) A scheme of reclamation and the costs thereof;

(e) Would set out that all costs of reclamation are part of the cost of the operation.

(f) Would specifically exclude from any economic activity all areas in Alberta designated as wilderness under the Wilderness Areas Act of Alberta.

(g) Would allow the Council to appoint an inspection branch to ensure that the activity is confined to the area shown in the permit and that reclamation procedures are being carried out.

(h) Would set out that no new strip mining permits be issued without proper advertising and public hearings held prior to the granting of a development or exploration permit.

(i) Would set out that every operator furnish a bond for reclamation in a sum equal to the estimated cost of reclam-

ation of the project or development. The amount of the bond may be forfeited if the reclamation as outlined and agreed to by the government is not carried out.

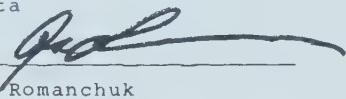
(j) Would set out severe penalties for non-compliance with any of the provisions of the Act.

The foregoing are some of the more salient features of the proposed recommended legislation and is not intended to be exhaustive of the remedies.

These recommendations are submitted with respect and in the interests of the public of Alberta.

Submitted for The Liberal Party
in Alberta

by



A. S. Romanchuk

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

In respect of the conflict between the Department of Mines and Minerals on the one hand and the Department of Lands and Forests on the other, are you suggesting a way of resolving the conflict if such exist?

MR. A. ROMANCHUK

We will set out in more detail, a scheme whereby there should be one over-all authority governing the Land Use Act which will control multiple land use of lands in Alberta. Rather than having the Surface Reclamation Council on the one hand, which is presided over by the Deputy Minister of the Department of Mines and Minerals, where it is that Department's policy to stimulate economic growth in the mining industry; and on the other hand the Surface Reclamation Council's policy of preserving the environment. We believe that a separate authority under one Act, which would displace many statutes that are presently invoked in the Province of Alberta, would satisfy the basic desires of the people in our Province and yet stimulate economic activity but provide the atmosphere for the preservation of our total environment,not only in the foot-hills, but also in the plains regions and in other areas of Alberta, where surface mining can take place.

DR. WALTER TROST

In respect of your support of the Wild Kakwa position, do you support both the wilderness areas concept and the surrounding restricted area concept?

MR. A. ROMANCHUK

Yes sir, we do.

We the local, Big Game and Guide Outfitters realize the extraction of minerals is necessary for the economy of the county - but that the big game habitat and environment need to be taken into consideration.

We realize that with reclamation requirements that areas strip mined would again be wildlife range after the area is re-vegetated, given 10 to 20 years after minerals have been extracted.

We therefore recommend that not more than 5 to 10% of a region above the 5200 feet level should be strip mined during one restoration period, which is estimated to be approximately 15 years. In so doing the strip mined area would again become suitable game habitat.

Consideration in the use of helicopters for mining areas, to be restricted only to mining areas, as big game have stampeded for miles from these helicopters flying too close in, to the meadows and mountain habitats. They should be able to pilot their flying course, without disturbing the big game in this area, all that much.

G. E. HODGES
ED. LIGHTFOOT

QUESTIONING BY THE AUTHORITY

DR. STUART SMITH

Mr. Hodges, I can appreciate some of your concerns with the disturbance of game animals in the mountains. The brief had mentioned the effect of helicopters but I understand from talking to other big game guides that exploration roads and exploration activities in general pose some problems for you in attempting to utilize these areas for commercial game guiding. Would you like to comment on this?

MR. G.E. HODGES

Yes, this is quite true, we have quite a problem. We like to see the helicopters working in an area where they are designated to work, otherwise they are flying in all areas. I've seen the helicopters, as far as, without naming mining companies, 20-30 miles away from the destination flying in the ranges of these mountains and they fly right in the meadows, the habitat of sheep and caribou, even when they are moving. You take a hunter in and these helicopters move in to take a look at a little divide on a mountain and the sheep are gone. You know what it is costing an American hunter to come into Alberta to hunt sheep. This has to be looked into. Why don't they stay in the destination and fly their routes? We would like to see this done very much so.

DR. STUART SMITH

How much would you estimate the average competent mountain guide has invested in an outfit... time, and so on? For a successful or a potentially successful hunt?

MR. G.E. HODGES

A good outfitter, if he has worked his property properly will look at a thirty to forty thousand dollar investment.

DR. WALTER TROST

When game are disturbed in the way you describe, is it a short term problem or do they leave that area for a longer term.

MR. G.E. HODGES

Last year we saw as many as four helicopters and a fixed wing land in the Sherman Meadows area. Some of them were working into the B.C. area out of Alberta and some of them were working right in Alberta picking seismic rigs up. Now, the game is moving and if the helicopters fly a pattern, definitely fly a pattern, we would be okay but they are flying within the terrain of the mountains at all times. They look like they're hunting.

DR. WALTER TROST

Do you think they are hunting?

MR. G.E. HODGES

I cannot answer that.

DR. WALTER TROST

Do you have any more comments you would like to make in respect of your submission?

MR. G.E. HODGES

I would like to see, if you have a coal exploration, that it is kept within the limit of where it should be working, not all over the whole country. I can show you country we've known for years and where I can now drive with a pickup, what are you going to do? How are you going to let this go on? We have no country left. Somebody has to do something and has to do it pretty fast. Upon some of the ridges there are roads that we can just drive for miles and miles, there are roads that have gone into places that are hidden valley country, that Banff and Jasper can't even come near us. What have you done? She's wide open. You can drive in there on the weekends. Our animals are moving they're leaving.

DR. WALTER TROST

Do you notice this in your own experience?

MR. G.E. HODGES

Oh definitely. Every day.

DR. WALTER TROST

What populations of what species have been affected?

MR. G.E. HODGES

I've seen 30-40 good sheep, lambs and ewes in mountain ranges. I shouldn't report this because I know there are more outfitters around here that would like to get in that area, but they're a lamb's usual stay. There people have folds of lambs and ewes where cats are working but your rams and that are running and there is nothing but helicopters and whole exploration.... I can tell you I was there all summer. We work in that area. I can hear a blast going every 20 minutes to an hour ... all exploration of Coal Ridge and Horn Ridge, they moved on the same area, Sulphur Range and they do the same thing. I think we have to do something and we have to do it fast because coal is a small item to what we have in our environment for our children and everyone else now involved right in this room. It is you people that have to start preserving these areas for a later date. Because damn, you can blank coal in Southern Alberta, let them sell it. Thank you, that's all I have to say.

BRITISH COLUMBIA, PEACE RIVER-LIARD
REGIONAL PLANNING DISTRICT

MR. DIETGER F. HOLLURAUS

MR. DIETGER F. HOLLURAUS

My name is Dietger Holluraus. I am the Regional Planner for the Peace River-Liard Regional District. As Grahame Allen mentioned before, we are working together on a resource planning study for the Monkman-Kakwa area and a large part of this area is a part of the Peace River-Liard Regional District. Grahame mentioned our meetings in Victoria and Edmonton with respective Ministers and I will just inform the audience what has happened in our area in the meantime. At the meeting in Victoria it was agreed that an 18 month period to evaluate the area in terms of resources or multi-use is too short and the Minister of Recreation and Conservation, Mr. Kiernan, asked us to do a study outlining just core areas of height, scenic, and recreational value. The deadline for this study was July, 1971. We prepared a report outlining these areas and we submitted this study to Mr. Kiernan at a visit to Dawson Creek. Consequently he wishes to submit this study to the Ministers and to his committee in Victoria where a decision will be made on these areas. We outlined four areas within the Peace River-Liard Regional District and I could just mention these areas, there is an area approximately 240 square miles taking in Kinuso Falls and Monkman Falls; an area taking in Kakwa Lake, Cecilia Lake, Babett Lake and which joins Willmore Wilderness and the Kakwa area in Alberta which is approximately 100 square miles in extent; and two smaller areas; one including Wapiti Lake and Onion Lake; and a lesser area just taking in 28 chains around Hoot Lake. Our study outlined on a 1:50,000 map, the areas above timberline, steep slopes, oil and gas leases, and coal leases. We excluded all these leases. Fortunately scenic areas were not touched by these leases so we might be in a better position. We contacted an Alberta based forestry company and the district forester in British Columbia and forestry has no objection to our proposal, so we are waiting at the moment on a decision from Victoria on these areas. Thank you.

QUESTIONING BY THE AUTHORITY

DR. STUART SMITH

How long do the prospective British Columbia and Alberta planning groups need to see this study completed before resource allocations are made?

MR. HOLLURAUS

The studies will differ a bit because the Alberta study is a resource allocation study and our study is a pure outline of scenic or recreational areas, so I think it is quite different. We have no indications if a complete study on resources will be done in our area. At the moment it is only based on the recreational areas and no large resources are involved in these areas. The only use we don't know is the potential for other minerals: copper, lead, zinc or molybdenum, but coal, oil and gas are not included in these areas.

THE IMPACT ON THE ENVIRONMENT OF SURFACE MINING IN ALBERTA

**PUBLIC HEARINGS
AT
LETHBRIDGE**

**CIVIC SPORTS CENTRE
DECEMBER 15, 1971**

**ENVIRONMENT CONSERVATION
AUTHORITY**



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THE CONTROL OF SURFACE COAL MINING IN ALBERTA

A Brief

Submitted to the Alberta Environment Conservation
Authority At Hearings Held in Lethbridge, Alberta,
on 15 December, 1971.

By

Pollution Control - Southern Alberta
P.O. Box 472 Lethbridge

A. Introduction

One of the concomitants of a technological and materially affluent society is a high rate of energy usage. It is unarguable that the future will bring increased demands for energy. Generally speaking, our energy comes (or will come) from two primary sources. One of these is atomic power from fission or fusion generators; although this source has been used elsewhere recently, some authorities (Campbell, 1965?) have viewed it as being economically uncompetitive in Alberta for many years to come. The second source of energy is sunlight, and is available to us in the form of both water and timber and more especially as the fossil fuels which constitute the major fuel resources of Alberta. The fossil fuels represent finite nonrenewable resources - once depleted, they are gone forever. (Other potential energy sources, such as solar batteries and wind, are either useful only in limited localities, or are not yet commercially feasible for large scale energy production.) The most abundant readily usable fossil fuel resource in Alberta is coal; Campbell (1965?) estimated that Alberta has four to six times as much energy in the form of coal as in petroleum and natural gas reserves.

Up to the present time, the exploitation of Alberta's coal reserves has been governed by expediency; environmental considerations with regard to coal mining have received little or no thought and even less action: few mining operations have included even superficial reclamation.

The most recent data we have available (Campbell, 1964) indicated that 1,759 coal mines have been licensed in Alberta. Of these, only 55 were still in operation in 1964, including 23 surface (strip) mines, 21 underground mines, 10 combination underground/surface mines, and one of undetermined type.

It is recognized that these data do not indicate 1,759 separate mine locations, since some areas have been licensed and mined several times. However, the data do indicate to a degree the number of environmentally naive mining operations undertaken (and often abandoned) in our past history. These figures also demonstrate that proposed legislation must deal comprehensively with mining, and not be limited to control of only strip mining, since 10 of the 55 mines are listed as combined strip and underground operations.

It is nearly certain that the demand for, and value of, Alberta coal reserves will increase with time. It is perhaps a valid generalization that reserves of resources are characteristically overestimated, while projections for future demand are usually underestimated. The implications of this are that future demand will increase, and our reserves will be depleted, more rapidly than we have anticipated, with the result that we must face the probability of serious coal-mining-related environmental problems which will be more severe and more rapidly occurring than we might otherwise expect.

It is our contention that coal mining has produced a source of energy which has appeared to be cheap at least partly because the social and environmental costs of the development of that resource have not been included in its actual costs. It is true that social and environmental costs are difficult to evaluate - that the dollar value of good water retention in the upper catchment basins of our watersheds, or of unpolluted streams and wild-life habitats, or of recreational and wilderness areas, is difficult to assess. Nonetheless, these values are real ones, and we must find some equitable way of including such costs in our cost-benefit analyses. Failure to do so will result in false economies of resource development, and the basing of resource

development decisions on unreal (false) economics. We shall have to pay the social and environmental costs in any event; there is evidence that we are having to do so at the present time. What is necessary is to assign the costs to their rightful place: with the development and extraction of our resources.

Alberta's coal reserves lie in the mountains, the foothills and the prairies. Campbell (1965?) suggests that about 60% of Alberta's "probable" coal reserves lie in the prairies, and that this includes most of the readily stripable coal; he also (1964) designates the flat-lying coal seams of the prairies as potentially providing the main source of supply for coal-fired thermal-electric plants. Much of the mountain and foothills reserves (which include high-grade coking bituminous) is valuable for foreign and domestic steel (and other) industries. Research has been underway by The Research Council of Alberta to determine additional uses for our coal resources.

B. Environmental Deterioration

Environmental damage resulting from strip mining has been well documented in Alberta and elsewhere. In addition to aesthetic considerations, direct damage results from surface disturbances associated with both exploration and active mining operations, which have been found to be accompanied by erosion, siltation of water courses, reduced water retention, loss of topsoil and vegetation, and reduction of habitat for wildlife, fish and freshwater and terrestrial invertebrates.

Secondary problems, not necessarily limited to mining operations, include excessive and/or inadequate and improper road building, interference with water course flow, improper garbage and sanitary conditions for work crews, destruction of landmarks, general nuisance, wind-blown coal dust and

overburden dust, and danger from slumping and landslides from spoil banks of improperly placed overburden, and a variety of ills associated with general failure to carry out reclamation. Specific instances of damage in Alberta have been documented by the Alberta Land Preservation Society (1969) and the Alberta Fish and Game Association (1970), among others. We are confident that the E.C.A. is abundantly aware of these and other examples.

1. The mountains

Special problems here are related to the precipitous nature of the terrain, the rigorous climate, and to the fact that our watersheds have their headwaters in this area. Prime consideration must be given to each of these factors. Climatic and topographic features of the mountains work against quick reforestation, and effectively militate against its occurrence at higher altitudes. Topsoil is frequently measured in inches, not in feet, and its replacement following a stripping operation may be essentially only hypothetical. Water retention and slow, reasonably steady delivery of water are prime goals of good water management; the implications of stripping operations for these goals must be well understood. Slope angles as well as water retention and danger from erosion and siltation MUST preclude mining operations in some areas. In addition, it is probable that mining (or other resource development) must be prohibited in order to protect areas of scenic grandeur and/or ecological importance.

2. The foothills

Here, the economics of mining operations must be reasonably balanced with the value of the land for other purposes, including not only recreation and simple aesthetic considerations, but also the management of renewable resources (water, timber, etc.). We do not wish to over-stress the point,

but the value of the foothills region for tourism and recreation will continue to increase in the future, long after nonrenewable resources have been depleted. In this regard, we point out the increasing use of these areas by vacationing urban dwellers. As urbanization continues, the value of the foothills region for recreation and aesthetic appreciation will be enhanced increasingly.

3. The Prairies

Special problems are here anticipated in the following categories: (1) wind erosion and air pollution by dust, (2) competition with agricultural production, and possible loss of land productivity, and (3) water pollution. In some areas of the prairies, nearly continuous high wind velocities are common and present a serious potential source of nuisance, agricultural damage, and health hazard; we must take care to avoid any "dustbowl" effects, with resulting loss of topsoil and distribution of coal dust and other debris. Much of the prairies is used extensively in agriculture, and the long-time productivity of land temporarily used for surface mining must be guaranteed. A short-term profit in terms of temporary employment (and royalties to the province) would be a poor exchange for long-term reduced soil productivity, and lowered agricultural output. In addition, care must be taken to preserve areas of natural prairie, and those of archaeological, paleontological, or geological value. Water pollution in the prairies is a potential threat not only by erosion of exposed land and concomitant stream siltation, but also from the addition of large quantities of clay-containing water from coal washing operations. Campbell has indicated (1965?) that "almost all coal seams in southeastern Alberta are badly split by clay bands, many of which would have to be mixed along with the coal in strip operations". If extensive washing of such coal is required, then especially fastidious

water treatment must be undertaken before allowing effluents to re-enter watercourses.

C. The Future Control of Coal Mining in Alberta

1. General statement

There are some areas where reclamation is presently impossible or where, because of environmental or other considerations (e.g. erosion, siltation, expense, or preservation of land for other uses), development is contraindicated. We cannot emphasize strongly enough that environmental considerations must be overriding in the determination of whether or not to allow exploration or, if exploration has been undertaken, to allow development to occur or to continue. Exploration and mining at high elevations (6000' and above) and at some lower elevations present difficulties and complexities which we are not yet (and perhaps never will) be able to overcome. A representative of PC-SA was one of a group of biologists who examined the high-altitude operations of Kaiser Resources, Ltd., near Sparwood, B.C.; although Kaiser's plans and hopes for reclamation are perhaps better than those of most Alberta mining operations, Kaiser personnel readily admitted that they are pioneering at high-altitude reclamation. On the basis of expert opinion, we seriously doubt Kaiser's ability to match its expectations and hopes with performance. Our view is shared by others, including the Canadian Society of Zoologists (1969, pp 4-13) and the Society for Pollution and Environmental Control (1969).

High wind velocity areas should likewise be given special scrutiny before allowing mining to begin; reclamation plans should carefully specify means by which erosion and dust problems will be minimized.

It may be that degree of disruption, slowness of recovery, and/or

special other value or use must preclude exploitation of some areas for strip mining. If there is any reason to believe, on the basis of prior experience, research, or expert opinion, that mining and reclamation cannot be accomplished as proposed, the Department of the Environment must have the authority to require changes in plans, to delete trouble areas, or to reject applications for exploration or development entirely. We recommend the adoption of a general policy prohibiting strip mining on slopes steeper than 28° and auger mining on slopes steeper than 33°. In addition, we recommend that research be conducted to determine whether high wind velocities sufficiently interfere with mining or reclamation operations so as to preclude or otherwise limit or restrict them.

2. Exploration

We recommend that strict control be exercised over exploration for coal, and that exploration permits be granted (a) only in those areas where ultimate development is not contraindicated, (b) only when appropriate prerequisite plans have been submitted indicating in detail the anticipated extent and impact of disturbances caused by exploration, and detailing how disturbances caused by exploration will be reclaimed; and (c) only upon the posting of a performance bond for the reclamation of such disturbances, such bond to be determined by the extent and type of exploration. The use of bulldozers or caterpillars must be strictly regulated, and companies must take steps to ensure that operators are aware of the regulations. We further recommend that reclamation of exploration disturbances shall be defined to include roads and other disturbances developed for or created by exploration. We recommend that if stripping is not anticipated within one year of exploration, that reclamation be implemented, and that failure to do so shall result

in loss of performance bond and refusal to issue further exploration permits.

Consideration might well be given to the time of year during which exploration may be permitted, so as to optimize chances for successful reclamation should economically feasible operations not materialize; re-establishment of vegetative cover, for example, should be undertaken at the beginning of the growing season, not the end.

3. Operation

It is well known that reclamation is most economic when it is anticipated and planned comprehensively in advance. Therefore, we recommend that application for a permit to operate a mine must contain a detailed statement including (but not limited to): (a) the anticipated environmental impact of the proposal operation; (b) alternatives which have been considered; (c) plans for reclamation, including previously abandoned mines in the area under consideration, and specifying: degree of reclamation; subsequent possible, probable or proposed uses of the land; species composition of re-seeding or replanting operations; anticipated seeding or planting catch or germination; and an estimate of the likelihood of 75% vegetative cover upon completion of reclamation; and finally (d) posting of a performance bond vis-a-vis completion of reclamation.

Roads must be constructed according to good practice and as defined by the Province, including proper placement on the landscape, proper drainage, and the appropriate use of bridges or culverts sufficient to take into account high water flow during spring runoff.

Dumping of overburden, spoil bank placement and other disturbances should be prohibited within 100' (horizontal) of any stream, lake, road or public property.

A maximum allowable time limit for disturbed land to remain unrestored must be set; the appropriate length may vary depending upon terrain or other conditions, and we recommend that (a) research be undertaken to determine what constitutes an appropriate length of time after which reclamation must be initiated, and a limit after which it must be completed, for mountains, foothill and prairie operations, and (b) these times be specified prior to the granting of an application to operate a proposed mine. As a general rule, we recommend that grading be done within 45 days after coal is removed.

The proposed use of water for washing coal and for other procedures must be accompanied by the appropriate and effective use of dykes, settling basins, etc.; polluted water must not be allowed to re-enter the waterways. Settling basins must accommodate the amount of water used, and must remain effective (i.e., ponds must not be used, or must be re-excavated, upon filling in with sediment). As a general criterion, water downstream from the operation must be maintained comparable in quality to that upstream from the operation.

In most areas, topsoil should be separated from overburden, and overburden from the coaly spoils often adjacent to the seam; these must be replaced in reverse order. Disposal, movement, or temporary storage of soil and overburden must not cause slumping, slides, erosion, siltation, or air pollution hazards.

The maximum area disturbed at any given time must be specified by law, with the provision that maxima may be reduced in consideration of certain terrain or other local factors. Maximum cut and bench widths must be specified by law, and these maxima must be related to the degree of slope. No fill bench may be created on slopes above 33° (the angle of repose). Maximum slopes for

the highwall must also be specified (we recommend 45° or less).

An explicit citizens' complaint provision should be incorporated in legislation, and should provide for complaints originating from exploration, development, and improper or incomplete reclamation.

Provision should be made for the stipulation of other anti-erosion or antipollution measures (a) in specific cases as the situation warrants, and (b) as the results of experience and/or research dictate.

Penalties for infractions of regulations should include warnings, stop orders, fines on a per diem basis, forfeiture of performance bond in toto or in part, and refusal of additional and subsequent permits for exploration or operation to operators who have forfeited performance bonds.

4. Reclamation

While reclamation has been referred to, and inferred, previously, we present here additional recommendations and expansion of previous references to reclamation.

In many instances it may prove to be the case that existing abandoned mine sites are unreclaimable; however, improved techniques and emphasis on reclamation may allow some improvement in previously abandoned mines. We recommend that any presently abandoned underground or surface mine, reasonably encompassed in an area where a permit for operation is applied for, be included in restoration plans accompanying the application. As mentioned earlier, comprehensive and detailed plans for reclamation must be a prerequisite for the granting of an operating license, and a performance bond must accompany the application (or be supplied before the license is released). The amount of the bond must be determined in advance, and research may be necessary to determine whether the bond should be a set figure (say

\$400/acre) or should be based upon independent estimates of the cost of reclamation.

Uncompleted restoration shall result in one or more of the following: (a) loss of performance bond, (b) company to be liable for overage on reclamation costs, (c) loss or denial of future exploration or operation licenses, and (d) fine and/or imprisonment.

Reclamation plans should specify the type and degree of reclamation to be undertaken, and should specify final soil depth, plant species to be planted or seeded, animal species (if any) to be introduced, specific listing of introduced (non-indigenous) species, and anticipated survival rates under local climatic conditions.

Prevention of erosion and siltation, re-establishment of vegetative cover (minimum 75%), subsequent probable use, and maintenance of aesthetic qualities must be considered in reclamation. Developed land must be restored to its previous use and potential if required by the owner or by the Department of the Environment.

All areas of disturbed land (e.g. portals, adits, roads, support facilities, etc.) must be included in reclamation plans. Explosives (if any) must be removed and accounted for. Seeding should not be regarded as sufficient for reclamation; we suggest that in most areas 75% vegetative ground cover should be specified.

Authority to confer reclamation certificates, or their equivalent, indicating satisfactory performance of reclamation, must be vested in the Department of the Environment.

Proposed deviations from statutory regulations must be regarded as public knowledge, indicated in writing, and subject to public hearing by

the Environment Conservation Authority.

D. Final Remarks

While it might be argued that all of the above results in too severe an obstruction of resource development, we do not agree. Coal mining companies in areas where stringent legislation has been passed traditionally have presented this argument, but the subsequent results have gone against the prophesy of retarded coal recovery and economic doom. In Kentucky, Pennsylvania and other areas, coal production has consistently increased following the introduction of restrictive legislation. What has also happened is that many areas which might have become desolate moonscapes and sources of long-term environmental and social costs have been restored to productive and valuable use, poor (and dangerous) mining practices have been reduced or have vanished, and even the coal companies speak with justifiable pride of their environmental attitudes (Jackson, 1964).

Furthermore, with specified standards in legislation, all operators are on essentially an equal footing insofar as knowing what is expected of them.

A concomitant of effective legislation, however, is effective enforcement. Experience both here and elsewhere has demonstrated time and again that voluntary controls, company public awarenesss, and good intentions simply DO NOT WORK.

As to the prediction of a rosy economic future for Alberta if coal mining (or any other resource) can be developed without "too many restrictions", we should be remiss in failing to point out that in our opinion, (a) the rosy economic future is that of the entrepreneurs, (b) the coal is not at present going anywhere or deteriorating in usable quality,

(c) it will only increase in value as reserves elsewhere are depleted and energy demands increase, and (d) the Province thus far has been receiving too little, and spending too much, to develop our resources and aid our resource developers.

Finally, we believe that development has been entirely too haphazard up to the present, and that the people of Alberta wish not to stop such development, but only to place it under control so as not to jeopardize the environmental heritage which is theirs, so that it may in turn be bequeathed, intact, to subsequent generations. We cannot, we must not, sacrifice our renewable resources or our scenic and aesthetically magnificent province, for the sake of rapidly extracting and exporting our nonrenewable resources. These are simple statements and they reflect simple values, but their importance is ever increasing and we must heed them.

E. References

Alberta Fish and Game Association. 1970. [Coal Mining Damage in the Grande Cache Area]. Report to the Provincial Government, 60 pp.

Alberta Land Preservation Society. 1969. Coal Mining Damage in Alberta. A Brief submitted to the Government of Alberta, 38 pp.

Campbell, J.D. 1964. Catalogue of Coal Mines of the Alberta Plains. Alberta Research Council, Preliminary Report 64-3, 140 pp.

_____. 1965? Coal Resources in Southeastern Alberta and their Setting. Alberta Society of Petroleum Geologists, 15th Annual Field Conference Guidebook, pt. 1, pp. 226-235.

Canadian Society of Zoologists. 1969. The Rape of the Environment. A Statement on Pollution and Environmental Destruction in Canada, 40 pp.

Jackson, Daniel. 1963. Strip Mining, Reclamation and the Public. Coal Age, May, 1963, pp. 84-95.

Society for Pollution and Environmental Control. 1969. Preservation of Elk Valley, Brief submitted to the Government of British Columbia, 2 pp.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

You mentioned environmental and social costs in your introduction. I think you detailed environmental costs in your brief. Do you have any particular thought in mind of social cost related to strip mining?

DR. PAUL LEWIS

The kinds of things that I had in mind include such things as: deterioration of water quality; siltation and erosion which affect downstream users. At present, if these kinds of things are to be remedied and they have to be remedied - the funds for their remedy generally come from the general public through taxation. It seems to me that these kinds of costs are at the present time borne by the general public. Additionally, I think that the whole problem of watershed management and the availability of water in our water courses is related to the degree of stripping and other activities which affect water retention in the foothills and the mountains. In Lethbridge recently, as our mayor and city council well know, we have been concerned with the amount of effluent that the city has been putting into the water supply. We have instituted, or are about to institute, secondary sewage treatment. The Oldman River comes from these water sources. Its waterflow is low in the wintertime, and the flow is not that high during other parts of the year except at the time of spring run-off. Consequently we have to be particularly careful about the kind of sewage treatment and the amount of treatment that we use, to prevent damaging the river. To the extent that those kinds of operations affect waterflow and to the extent that the river flow is reduced, this represents a burden that must be paid in terms of additional sewage treatment, not exclusively, but largely, by the citizens of Lethbridge. This kind of example I think can be cited right on through the province. The major industrial activity down here is related to agriculture. If large-scale stripping operations take place in the prairies, and if there is a loss of productivity as far as the soil is concerned, this is going to have severe ramifications for the economic future of Southern Alberta. It comes right to home here in Lethbridge although I suspect that most people in Lethbridge are not as aware of that as I wish they were.

DR. WALTER TROST

You made reference to certain kinds of area studies that the three universities were conducting, a cooperative or an individual basis. Do you want to say anything further about the kinds of measurements they are making that may be relevant to certain resource development and environmental problems?

DR. PAUL LEWIS

I can only speak generally but sometimes long-term research studies are undertaken and suddenly upstream development can cause changes in conditions in the

stream and the results of long periods of research can be effectively invalidated or nullified. The development of a research station has implications that are reasonably indirect as far as society is concerned. But, to the extent that we can learn more about the eco-systems and the environment of our own regions, particularly the mountains and foothills, we will be better able to protect, preserve and utilize that. It would be a shame to cause a reduction in our capacity to learn about these areas. I don't mean to infer that the university research stations are the only areas of information in this regard, but they are sources of information, and that they ought to be protected in this way.

I would also like to make a point. Mr. Webb presented some nice pictures of wildlife and other species of organisms and indicated that they can be affected by these operations and by other kinds of things as well. Many people might ask the question: what value is this? We can get along without Bighorn sheep, we can get along without the peregrine falcon and so on. In some ways, yes, we can. But in other ways these organisms serve as indicators, some are better indicators than others, of the quality of our environment and our watersheds and of other areas that in the long run are going to be very important to us. To the extent that they can remain in those areas as healthy populations, we can be sure that our eco-systems are healthy or are operating effectively and I think this is their prime value to us.

MR. PAUL BABEY

You mentioned the possibility, in the long term, of reducing soil productivity. With the application of modern techniques, is it possible to reclaim the land in order that it may be as productive or even more productive than it was before the stripping operation?

DR. PAUL LEWIS

I think in many cases that this is so. There have been suggestions from some of the areas in Kentucky that in fact land that was not very productive has become more productive as a result of reclamation following strip mining. I know that some parts of Southern Illinois which had been of very little value now as a result of stripping operations, are quite attractive. Much as I'd like to attribute this to the foresight and public-spirited attitude of the coal mining companies who are operating there, in fact, these areas were reclaimed naturally. I think there are also dangers that have to be considered here. I don't know about these things and I think that in many cases we collectively don't know and we have to find out. For example it has been suggested that good growth of some kinds of dry land vegetation is related to fungal associations that occur around the roots. If the soil is sufficiently disturbed to destroy the fugal associations, then replanting will result in diminished growth or in poor growth. It might be necessary to find out what these fungi are, and culture them; and add them at the time of replanting. We might be able to

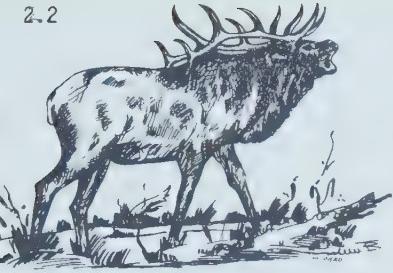
turn a detriment into a benefit. I said some fairly harsh things about stripping operations. It comes from feelings of exasperation and helplessness at what has been going on in the past. I think that none of us can argue that these operations are not important and or not necessary. But we have to control them and see that we go about this in an ecologically sensible way. In the long run I think ecologically sensible ways, if you add up all of the costs and all of the benefits, are going to be the most efficient and economical. We have to add up all of the costs and make sure that we're not over-looking some of them.

DR. STUART SMITH

I wonder if you would speculate briefly on the potential for cooperative research between Alberta universities, coal companies, government agencies and the like, to do two things: To increase the rate of knowledge acquisition with respect to these problems and also to give a better understanding in these three sectors of mutual problems. Would you care to comment?

DR. PAUL LEWIS

Yes, if I can speak candidly here, in some university settings there has tended to be an abhorrence of contract research. I think that this has been too bad. It's been regarded as something to be shunned. I'd like to see that kind of thing developed. In my particular area I doubt there is very much that one could do unless strip mining has an effect on internal parasites but there are a number of people working at Alberta universities who could provide good information and who have expertise that would be quite applicable. I think that it would be a good idea to look into developing this source of information. I can see some dangers to it as well but I suspect that the researchers in the universities ought to be reasonably well able to defend themselves against any possible hazards.



LETHBRIDGE FISH & GAME Association

P.O. BOX 495 - LETHBRIDGE, ALBERTA

Mr. Bill Yurko,
Minister of the Environment.

Our Association is greatly concerned about the detrimental effects upon the environment, caused by the acceleration of coal exploration, and mining operations in Alberta. Our main area of concern is specifically within the Forest Reserves of Southern Alberta, however the problem is much the same over the entire Province.

The past year has seen a great deal of activity in the Racehorse Creek, Daisy Creek, Dutch Creek, and Oldman River areas. In the upper reaches of the Oldman River, several miles of new roads were built to accommodate coal exploration activities. Even though these roads may be closed when operations are finished, the roads are still there, and the damage that they have caused to the topography by causing soil erosion, and the resulting pressure put upon our wildlife by the access afforded to the high country, by these roads, must be considered very carefully.

Considerable supplies of coal were found in the Oldman River area, and if these deposits are to be mined in the future, and we have no reason to believe that they won't be, more and better roads will have to be built, and probably even a railroad. This would only compound the existing problem and thereby, deprive our wildlife of still another homeland, and deprive every citizen, and tourist, of the scenic beauty, and recreational value of this remote area.

Our Association feels that the average 10¢ per ton royalty which is collected by the Government, for coal mined in Alberta, only amounts to a pittance when compared to the value of the Forest Land which has been destroyed in this Province.

We believe that we have a certain responsibility to ourselves, and to future generations, to preserve, and protect, as much as possible, the remainder of the fast diminishing forest area of the Province.

While we realize that progress must, of course, go on, we urge you to make an effort to establish new mining areas only along existing roads, and railroads, wherever possible, and that a workable system of reclamation of mined areas, be rigidly enforced before operators are allowed to move to new areas.

Respectfully submitted,

G.M. Pittman, President.

"A GAME HOG IS A THIEF"



QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

You expressed an attitude to strip mining in the forested lands, the foothills and the mountains, have you any comment in respect to strip mining on the prairies themselves?

MR. G. M. PITTMAN

There probably is a greater abundance of mining in the prairie area, however we feel the biggest problem is one of reclamation. Reclamation is easier to do in the low-lying prairie areas than it is in the mountains. Therefore our greater concern lies with the mountains.

2.3

COLEMAN COLLIERIES LIMITED

"Strip Mining of Coal & Conservation of Environment"

Environment Conservation Authority

Public Hearing

15th December, 1971

PRESENTED BY MR. E.D. JAMIESON

1.

INTRODUCTION

Coleman Collieries Limited is a member of a group of Canadian owned companies in the fuel production field and as such is interested in increasing the use of coal in Canadian markets, and in the efficient long term exploitation and conservation of natural resources in Southwestern Alberta.

Coal has been mined for over 70 years in this area and Coleman Collieries is the sole surviving operator on the Alberta side of the Crowsnest Pass. Being the principal employer in the region makes it very important that the Company's activities continue and that an economic burden imposed by exaggerated ecological enthusiasm should not be allowed to cripple the operation.

At the same time it must be pointed out that the Company takes a very serious view of its responsibilities regarding environmental control of its current operations, and reclamation of the affects of past mining activities in the Coleman area.

Most of the Company's production comes from underground mines and strip mining will always remain of secondary importance. It is not envisaged that Coleman Collieries will ever operate surface mines on the scale of Kaiser or Fording River. The present strip mines are both located within the Crowsnest Forest Reserve and so come under jurisdiction of the Department of Lands and Forests. This department is zealous in enforcing existing regulations regarding exploration and strip mining and monthly meetings are held in Edmonton to discuss proposals presented by Coleman Collieries on future operations.

2.

LEGISLATION

(a) Philosophy:

In principle Coleman Collieries is in agreement with the need for legislation on conservation of the environment to determine responsibilities and to lay down guidelines for surface mining operations. However, some of the points laid out in the position statement prepared by the Environment

Control Authority require firmer definition or redrafting.

It is agreed that comprehensive environmental planning is necessary and that such plans should be presented by the operator to the appropriate government body before the operation commences. The responsibility should therefore be jointly born by the operator and the government for the plan which is finally agreed on. If the operator shows that the project in its final form is economically unfeasable, then the government department must realize that this may result in unemployment or curtailment of operations which may be damaging to the Province as a whole.

Compensation for environmental damages is an extremely vague concept as it boils down to who decides what is a "unique feature of the environment" and who decides how much this unique feature is worth. Each case would have to be decided on its merits and so specific regulations cannot be drawn up to cover all factors.

The Government of Alberta is elected by the people of Alberta and so represents the will of these people. Specific responsibilities are delegated to government departments and it is therefore unnecessary for public hearings to be held on plans for developments which should be decided between the operator and the departments concerned. This precept is very well stated in point 2.7 "Delegation of Administrative & Enforcement Responsibilities" and this is considered to be a practical manner in which to deal with the matter.

(b) Conceptual Framework

It is strongly felt that one single set of regulations cannot apply to all geographical areas of the Province as mining conditions vary tremendously between the plains and the mountains. For example when the Department of Lands & Forests issued guidelines for reclamation they stated that no spoil dump should have a finished slope of more than 20°. This regulation could not possibly apply in the mountains where most natural

slopes are of the order of 25°. It is therefore considered that slopes of 27½° should be allowed.

To decide that all regulations will apply equally to public and patented lands introduces all sorts of foreseeable difficulties especially in the realms of permission to carry out inspections and in the application of penalties for violation of the regulations.

(c) Principles

Regulations governing the reclamation of mining areas must take into account the original surface characteristics so that the mining company does not find itself in the position of having to establish an alpine meadow or a forest of spruce on what had originally been a 30° talus slope at 7,000 ft. elevation.

As far as the retroactive application of responsibility for reclamation is concerned, Coleman Collieries has a very good record which visitors to Coleman may now begin to appreciate. Refuse piles have and are being contoured and seeded successfully, mine effluent treatment has been established, old buildings have been demolished, roads have been paved and old settling ponds have been filled in and grassed. Much remains to be done but it is being done and the marks left by 70 years of mining in Coleman are rapidly disappearing.

Coleman Collieries consider that the strongest representations must be made against inclusion of a "financial security deposit" in the new legislation. The measure is unjustifiable as a deterrent to ensure the good behavior of a long established company and unjust in legislation which contemplates severe penalties for violators of the regulations.

CONCLUSION

Coleman Collieries agrees that conservation of the environment is important and that legislation to define procedures and responsibilities is necessary.

The comprehensive conservation plan is the most important single

factor in the successful integration of mining operations and minimization of damage to the environment. This plan must be presented by the Company and approved by the government, who must accept their share of responsibility for it, before operations commence. The existing "Environmental Control Commission" of the Department of Lands & Forests should be taken as the model for new legislation.

E. D. Jamieson, P. Eng.
Chief Engineer

EDJ:ck

December 15, 1971

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

You indicated that it would be practical to distinguish between the plains, the foothills, and the mountains when devising regulations for strip mining. Do you think they have elements in common that would enable some common approach?

MR. E.D. JAMIESON

I think they should be kept under separate headings because there is a lot of misconception. I heard today, references to Kentucky and Illinois and places like that which have no bearing whatsoever on conditions which are encountered in the mountains. We have small pockets of coal. In the area in which I've been carrying out exploration (which is from about 40 miles north of Coleman to about 10 miles south) there is no large area of strippable coal. Our Tent Mountain mining area which has been operating since 1946 is quite a small operation and at the moment we are producing in the order of 1/4 million tons per annum from this. This is our biggest stripping area. This is under very difficult conditions. We have clinal conditions, and under-ridges, which means overburden is of the maximum so that we have steeply pitching seams, 25-40° or even more. Where you have stripping, as was mentioned here today, on relatively horizontal seams of the plains, to me the reclamation or the conservation is not at all similar.

DR. WALTER TROST

So that when we are talking about strip mining, we should be clear in our minds which area we are talking about.

MR. E.D. JAMIESON

I think so.

DR. WALTER TROST

You mentioned that the majority of your mining in the mountains is underground in the proportion of 7 to 3 and that probably it would continue in a similar proportion in the future. Can you tell us how your problems from underground mining compare with those from strip mining from an environmental impact point of view?

MR. E.D. JAMIESON

The environmental impact from underground mining is much less than strip mining. Our main problem in strip mining as far as environmental damage is concerned is the altitude. We are operating at between six and seven thousand feet elevation. One of our strip mines, about which I had a lot of discussion with the Departments of Lands and Forests, is on a westward facing slope. The seam pitch is at approximately 25° and so is the slope, so that this is more or less a continuous strip going right down the hillside. This was a natural tailor slope and reclamation is being insisted on, as I pointed out, to bring it back to more than what it was. This is fair enough. We put forest strip on to it but this is one of our biggest strip mines where we are in pockets I don't see ever getting to more than 30%. We are improving the mechanization of our underground mining so that the productivity of our underground mining is beginning to approach that of our strip mining. The main reason for having 70% underground coal is the quality. We must have this to maintain the quality of our final product.

DR. WALTER TROST

To meet the recipe that your market demands.

MR. E.D. JAMIESON

Yes.

DR. WALTER TROST

Nevertheless there must be some advantage to you in the strip mine to maintain them?

MR. E.D. JAMIESON

Oh, yes, we can still produce more cheaply from strip mines than we can from underground.

DR. WALTER TROST

Is it by an appreciable factor?

MR. E.D. JAMIESON

An appreciable factor, but diminishing.

DR. WALTER TROST

You described in a brief way the regulations that you now operate under, mainly that they derive from Lands and Forests and have to do with exploration and the actual extraction of the coal. Do you want to elaborate for the benefit of those who are in attendance, as to what reclamation standards are required of you now?

MR. E.D. JAMIESON

When we apply for exploration permits we immediately come under the jurisdiction of the Alberta Forestry Service. Before our application can be approved we must visit the site with one of the foresters. At that time, on the ground, we discuss what reclamation will be needed, how we will put in culverts; where the roads should or should not go; and what reclamation procedures will be required in the case of roads and drill sites. This is pretty comprehensive.

DR. WALTER TROST

In implementing the reclamation procedures, do you need to employ people with particular skills or build-in expertise that you otherwise would not have to do?

MR. E.D. JAMIESON

Yes, but I might add that this is seasonal work so that the people that are employed in this during the season are employed in other work during the rest of the year.

DR. WALTER TROST

I know the next question is one that you can't answer specifically, but, generally what time elapses in your operations between opening a pit and closing it in a reclaimed state?

MR. E.D. JAMIESON

It depends how far you go with the reclamation. If you say that it is contoured or levelled off and seeded, if you get to that stage, then I would say of the order of six... no, I'd be safer to say five to ten years.

DR. WALTER TROST

Is it possible for you and your company to calculate the costs of reclamation. I'm thinking of it in two ways: The cost that it might impose on you when you're first thinking of it; and the actual cost of it after you've practised reclamation and integrated it into the mine operation?

MR. E.D. JAMIESON

You are speaking about something that we have dropped into the middle of. I have spent most of this year revamping our strip mining plans with these costs. At the moment we are still catching up with current operations. We will in the first half of next year, look at complete projects but Tent Mountain has been operating since 1946 and I'm trying to catch up with that one. I've dropped in with a racehorse strip which is an operational mine.

DR. WALTER TROST

We very much appreciate difficulties that the mine operators are put to and also in the end, that the expertise needed for reclamation will have to be developed under their supervision.

MR. E.D. JAMIESON

Yes, I agree with that. I think the Department of Lands and Forests and the Alberta Forestry Service can help tremendously. I honestly believe that they should be the supervisory force, as all our mines are located in the Crowsnest forest.

As far as research goes. I know that the Research Council of Alberta are doing some work on environmental control. I think they were doing it for McIntyre Porcupine. As a matter of interest, on one of our exploratory programs last summer, we were drilling up near Livingstone Falls, and I did come across one of the university stations and moved the drill hole so that it would not interfere with their work.

DR. WALTER TROST

You had valuable comments on the position paper indicating that there were difficulties in deciding the magnitude of the compensation for environmental damage and that the responsibility for a certain aspect of the regulation should be borne jointly by government and by industry. It seems to me these are important points in your submission, do you want to elaborate on them?

MR. E.D. JAMIESON

I think we are in a vague field there and that is what has got to be really nailed down. People can speak about environmental damage, recreational damage. But it has got to come down to either operations carry on or someone decides that one mountain is of particular value. I'll draw another parallel here and this is the

ancient monuments in Britain. Someone will decide that money has to be spent to conserve an old house or something and it is defined as an ancient monument. Someone here is going to have to define that certain mountains are of environmental importance and should not be touched. All the consequences of that will have to be looked into very carefully, and anyone who's operating in that area will have to be made aware of what the effect on his future production, I mean 20-30 years hence, will be.

DR. WALTER TROST

Yes, but your basic position in your presentation was that reasonable environmental management if worked in a proper way was desirable and practical. Is that right?

MR. E.D. JAMIESON

Yes. I will add to that that what I'm stressing is that once the plan is agreed to (and this is where I really attack the performance bond) then the government department has agreed to what the mining company should do. If the mining company then doesn't carry it out, it should be liable to penalty, but not to lose a sum of money which it has laid down as much as ten years previously.

DR. WALTER TROST

Yes, I think that's a straightforward sort of financial proposition in the way that you make it.

MR. E.D. JAMIESON

Right.

MR. PAUL BABEY

Mr. Jamieson, you mentioned that Coleman Collieries pioneered the Japanese market. Recently I've noted in the press some statements indicating some unhappiness on the part of the Japanese; how would you describe the potential markets in Japan?

MR. E.D. JAMIESON

If we go into potential markets, I'd say potential markets are extremely encouraging. The Japanese economy is undergoing, not a recession, but a diminishing increase in its capability. Instead of having about 10% annual increase they've dropped about 4%, which is really serious for them. We have firm commitments to Japan for the next ten years. I don't see it growing for maybe two years until the Americans straighten out their economy. Not that there will be much change in this, but I do see it growing. But added to this, and much more important, is that we are looking at markets elsewhere. I'm getting a lot of encouragement because western Canadian coal is excellent coking coal, one of the best coking coals in the world. We have shown that even though we are 700 miles from the coast we can ship it out economically by rail and sell it in Japan and it's comparable to world prices.

MR. PAUL BABEY

In your stripping operation at Coleman what is the elevation of the mine?

MR. E.D. JAMIESON

At Tent Mountain we have what we call the No. 4 North at the moment which is 5900 to 6100 feet. Next year we will be going up to what was the No. 2 pit and that is up to 7,000 ft. elevation. A racehorse strip is between 6400 and 6600 at this moment but was started off at 7,000 and has worked its way down the hillside.

MR. PAUL BABEY

In your experience have you had any difficulties in regenerating growth at this level?

MR. E.D. JAMIESON

Well, my experience as of this moment is confined to one year in this country but, yes, there is difficulty in regenerating growth. This is what I've put into my Brief. I've said that over 6,500 ft. growth of any description is difficult. At Tent Mountain I pointed this out to a meeting of the Environmental Control Commission. If you stand on Tent Mountain, where all the mining is going on, and you look across the valley to Mount Ptolomy, you don't see any growth on Mount Ptolomy. You just see grey, scree slope. As I say we cannot guarantee that we will produce a forest of spruce at that elevation and I think that our conservation will be more in reshaping the rock that we have excavated

into reasonable configuration of what the mountain ridges were. We will re-seed but it will take a long, long time for trees to grow.

MR. PAUL BABEY

In your closing remarks you made reference to a reclamation plan. When do you feel that the reclamation should be developed and in what order should it proceed? I think you made some reference to "before commencement of operations".

MR. E.D. JAMIESON

Yes, but what I'm doing at the moment, is current operations, in which until the last two years environmental control was not an important factor. It now is, so we have revamped our plans of current operations for the reclamation phase. All our future plans will include this reclamation phase before operations start. This is what I'm saying: this should be presented to the government, agreed to by the government, and therefore, through correspondence we will have a certificate from the government saying that they agree with what we are doing, and in that way, they will accept their share of the responsibility.

DR. STUART B. SMITH

Mr. Jamieson, do you have any approximation on, say, a cost per ton basis of what reasonable environmental control may cost your company?

MR. E.D. JAMIESON

No, I can't give you that figure because it is costly.

DR. STUART B. SMITH

Would you say both your present ore operations and your future projections will allow for this cost?

MR. E.D. JAMIESON

No, I can't give you that figure at the moment. We have not been going long enough to generate accurate figures. I would just be giving you a figure which could possibly be quoted and I wouldn't want that at this time.

DR. STUART B. SMITH

Is it possible in principle to get such a fugure?

MR. E.D. JAMIESON

Yes.

DR. STUART B. SMITH

In your opening statement you express concern that the companies might be faced with an economic burden that would be intolerable because of exaggerated claims for environmental impact, or ecological impact. Do you have any specific examples of these exaggerated claims?

MR. E.D. JAMIESON

No, I'm just pointing out that danger. It could be that the weight of opinion from public hearings might come from very enthusiastic environmental conservationists and this might outweigh my feelings in the matter.

A BRIEF PRESENTED BY THE
LETHBRIDGE NATURAL HISTORY SOCIETY
TO THE
ENVIRONMENT CONSERVATION AUTHORITY HEARINGS ON STRIP MINING
DECEMBER 15, 1971
PRESENTED BY MRS. FRANCES SCHULTZ

The present generation of Albertans must accept their responsibility to future Albertans. We can no longer afford to squander our resources - economic or aesthetic. We must consider not just present but future needs as well, both for energy resources, water resources and aesthetic resources. Any resource development, especially by such a potentially destructive method as strip mining, must be carefully considered and as carefully controlled.

With this in mind, before any extraction of coal, or other minerals, by strip mining, the following factors should be considered:

1. Reclamation of the area -

- a) What ability has the area to recover itself? Is it suited by climate, altitude and other physical characteristics to reclamation? For example, a prairie area will develop cover much more quickly than a high alpine area.
- b) What methods have been developed to accelerate reclamation of the site? Perhaps the Province should be doing more research to determine more effective means of speeding up reclamation of various kinds of terrain.
- c) Is proper reclamation planned and guaranteed by the company? A bond of sufficient amount to cover the estimated costs of reclamation should be posted by the company before any development is permitted.

d) Is proper reclamation being carried out? A plan for reclamation should be prepared by the company and approved by the Environment Conservation Authority before development commences, then regular on site inspections should be made during the process of extraction and at the end of the project. If the ECA is not satisfied that the reclamation will be effective, there should be immediate termination of the permit, or suspension, until satisfactory reclamation has been done.

2. Balance of Costs -

a) Is the area of more benefit to this and future generations if it is left in its natural state? A careful evaluation of the area - flora, fauna, unique geological, historical or archaeological features, should be carried out, and its aesthetic benefits and potential recreational and economic benefits as a tourist area should be weighed against the economic benefits of strip mining. A special point of evaluation is the area's function as a watershed area. Water is our most important resource - and nothing should be allowed to endanger headwaters. No strip mining or other disturbance should be allowed in stream beds, or dumping in areas where erosion could effect streams. Exploratory activities should meet the same criteria.

b) Is there sufficient gain to the people of Alberta to justify strip mining? While many people are dependent upon the economic benefits from strip mining, care must be taken that the long term disadvantages don't outweigh relatively low short term benefits. A royalty of 10¢ per ton of coal doesn't seem like much of a benefit. Perhaps royalties should be reviewed. How much employment is

provided for Albertans by these companies? How much control are they exerting over Canadian sovereignty by their activities? Are they bound by Canadian government policy or by decisions in their own board rooms in some foreign country? Do they pay taxes on the profits they make to this country? Where do they obtain equipment and materials for their activities? These questions should all be considered when assessing the economic benefits to Alberta by these operations.

3. Provincial Parks and Wilderness Areas -

No amount of revenue can justify violation of these areas by strip mining operations. They are valuable non-renewable resources and must not be destroyed. Willmore Provincial Park, formerly Wilderness Area, has lost some 384 square miles to strip mining activities. We must not allow this to happen anymore.

In summary then, before any strip mining is contemplated, careful evaluation and balancing of long term costs against short term economic benefits must be carried out. If strip mining is to be carried out, strict precautions must be taken against wide-ranging environmental damage, and adequate reclamation practices must be determined and enforced.

December 13, 1971

2.5

ENVIRONMENTAL IMPACT OF SURFACE MINING IN ALBERTA
BRIEF FOR PRESENTATION TO THE ENVIRONMENT CONSERVATION AUTHORITY

by I-XL INDUSTRIES LTD. MEDICINE HAT BRICK AND TILE DIVISION
MEDICINE HAT, ALBERTA

Philosophy of Medicine Hat Brick & Tile towards Clay Mining and the Environment.

1. To comply with all regulations regarding mining procedures and techniques.
2. To upgrade operations where practical when this will improve relations with other land users or reduce damage to the environment.
3. To operate quarries at all times in a planned and orderly manner to achieve efficient mining and minimize damage to the environment.

Procedures and Techniques Presently Used

1. Disposing of overburden as back fill in mined out areas.
2. Saving top soil where possible for use in future reclamation.
3. Use of settling basins to control silt run-off.
4. Conducting exploration operations when conditions are such that there will be a minimum of damage to the surface.
5. Cooperating with Department of Highways in developing roads to resources.
6. Soliciting government assistance through the Department of Agriculture and Department of Lands and Forests to improve reclamation of disturbed lands.
7. Promoting utilization of abandoned mines for such things as sanitary land fills.
8. Maintaining slopes on back fills that conform to the natural slopes.
9. Conducting excavation work so that all slopes are left in a safe condition.

cont.....

Attitude to Further Regulations on Clay Mining

1. If stricter regulations are to be implemented then there must be more cooperation with the resource developer on the part of government agencies.

Areas where more cooperation is required:

- (a) Development of roads to resources.
If Department of Highways can be involved in planning roads to mining sites from the beginning of a project, one route may serve all facets of development. Experiences in the past have shown several routes are sometimes used before a final one is chosen. Had the initial route been worked out for a road allowance, the temporary routes would not have been necessary.
 - (b) Development of methods and plant species for revegetation of disturbed land areas.
These are wide ranging projects that can take several years of research and require very specialized people. ^{Departments} As such as the Departments of Agriculture and Lands and Forests, have the resources and know how to carry out this research. Cooperation between these government departments and resource developers is necessary in order for operators of mines to be able to meet further regulations related to control of the environment.
2. The attitude of "let the resource user pay" is not a reasonable one. In a situation where the public wants to maintain both resource development and environment protection there should be some cost sharing. This cost sharing should place some of the responsibility on the public sector through the use of government agencies to develop programs that will help mine operators protect the environment while maintaining efficient mining practices.

The public's share could be in the form of research programs on:

- (a) Land reclamation methods
- (b) Development of species of vegetation for land reclamation
- (c) Mining equipment and techniques to maintain efficient mining operations while protecting the environment
- (d) Developing other uses for abandoned mines
- (e) Developing cost share programs for building roads to resources

continued

By developing such cost sharing programs the overall economy of the province can benefit. It will eliminate the duplication of research that would develop if individual firms had to conduct their own programs to meet new regulations. The industries would be allowed to remain competitive with those in other provinces and countries and thus help to maintain a high level of employment within the province of Alberta.

Specific points of concern with the proposed legislation

2.3 Responsibility of Action on Resource User

Smaller companies cannot afford the research that is necessary to assess the long range effects of some aspects of strip mining.

2.5 Privileges as Opposed to Rights

The operator's privileges must not be revoked without sufficient warning to allow him to work out a solution to the environmental problem or to develop a new source of supply.

4.07 Reclamation

Time limits on reclamation should be flexible enough to cover unique situations that can develop in the mining of clay. (see item 2, page 4)

4.11 Retroactive application

A company should not be responsible for reclamation of a mine that was abandoned properly in the past. In such a case, the abandonment was carried out to the regulations of that time, and the company has met its obligations to the public. It incurred and accounted for the expense of abandonment in operations at that time and should not be subject to them again.

continued

Comments on *Prospectus on the Environmental Impact of Surface Mining in Alberta * page 6

1. The removal, storage and replacement of overburden and top soil

Mine sites can be vastly different. They can be on flat terrain, on top of hills, in valleys or in banks. The site can have no top soil or even no overburden. It can be in an area of little annual precipitation or one with a lot of moisture. All these factors can affect the removal, storage and replacement operations. The regulations should be such that the operator can work within them under the widely varying conditions.

2. The time lapse between opening and closure of trenches

A rigid time limit could create a situation where there is a waste of resources and/or expenditures.

- (a) The situation has developed where a valuable clay has been exposed in the mining of other clays above it. At the time of exposure this clay is the floor of the mine. There is not a specific application for this clay, and may not be for several years. Yet it would be wasteful to cover it up because of a rigid time limiting factor on open trenches.
- (b) Another situation that has developed is the backfilling of mined out wet areas that are adjacent to unmined clays. Backfilling will cause the unmined clays to be contaminated with mud and water, if they are not protected. If they are not protected, the clay becomes a wasted resource. Thus if the time limit factor requires backfilling before the mining operation has moved far enough away from the wet area to prevent contamination there will be a waste of resources or expenditures.

4. Re-vegetation of Spoil Banks

This would require specialized equipment and more information on species of plants and techniques of planting before it could be done successfully. Considerable expense could be involved.

5. Use of Contour Trenches

Most of the quarries are small in size and are developed along the strata beds. The combined effect of these two things would make it very difficult to develop functional contour trenches.

continued

7. Prospecting methods and use of heavy equipment such as bull dozers

The only disturbance of the surface by heavy equipment is the use of rubber tired front end loaders to dig test pits. These pits are an important part of exploration programs and should not be eliminated through too rigid regulations.

8. Construction and location of roads, trails and campsites

Regulations should provide for the use of road allowances as much as possible as routes to resources. This would eliminate the need of finding temporary routes, during exploration and early development to prove the worth of the resources.

continued

Extent of Medicine Hat Brick & Tile involvement in Surface Mining in Alberta

<u>Location</u>	<u>No. Active Quarries</u>	<u>No. Inactive Quarries</u>
Medicine Hat - Redcliff	2	2
Dunmore		1
Cypress Hills	4	1 (test pit)
Strathmore		1
Edmonton	1	
Athabasca	1	
Belly River		1 (test pit)

Typical Size of Land Disturbances

(shown in acres based on mining to end of 1970)

<u>Quarry</u>	<u>Stripped</u>	<u>Covered by overburden and Stockpiles</u>
#7	8.7	3.2
14	10.3	7.3
34	16.5	5.9
39	2.3	2.3
45	6.4	3.1
66	3.5	2.8

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

It might be interesting and helpful to ourselves and to the public if you were to explain the operation in respect of the material you're going after: how special the clays are, whether they are deposits that are stratified and extensive, or are local in nature; what proportion of the material that you extract is useful; and how special that product is, how delicate it is in mixing and so on?

MR. L.O. LINDOE

Industrially usable ceramic clays represent a very, very small fraction of one percent of what one would recognize as clay if you went about digging into exposures. The acceptability is very critical, very specified. So we end up with the situation where, after a great deal of shallow core drilling, we isolate an area of usable material. We still do not have a clay deposit. It has to be recoverable and so, under extreme conditions, 75 feet of over-burden have been removed to get at less than 20 feet of clay. This is very extreme. It has to be valuable and recoverable material to make this sort of thing workable. We consider ourselves fortunate when we have what amounts to one mine on top of another, so that there are a number of different strata, maybe separated by unusable material. We proceed downward through the mine until finally the relationship of the over-burden to the recoverable material would be something less than a 3-1 ratio; that is, three of over-burden to one of recoverable material. It would seem that economically we could go much beyond that except that mining situations get very, very difficult. The amount of over-burden then has to spread out laterally, and we run into really difficult differences in ratio. So we are limited to this two or three to one in most cases.

The places where one might encounter usable clay materials are anywhere. We have quarries, I say we, because in most cases I participated in the development when I was director of research for Medicine Hat Mercantile. We have quarries that are on absolutely flat land. It is a hole in the ground 100 feet deep and there is no place to put waste to start with, except alongside. Subsequently, all waste goes back into the hole simply because of good management, not necessarily because of the necessity of environmental control. It is simply the smartest, most sensible and cheapest way to handle things. You involve less ground that's under your command and less stuff that you have to move later.

In other quarries that are on steep hillsides, to put the material back in again you'd have to take it uphill to start with and in mining it is almost impossible to go uphill and place a waste pile. So generally one manages to build a local plateau out of waste material for stockpiling, general working on, and not to accumulate piles of waste but to build a piece of land that

has, at least for the time being, some use, and is secure and under control in the future.

Now, in pursuing these methods we have a very good reputation with the Department of Mines and Minerals and the Department of Lands and Forests because of our management policies, which really are the Department of Mines and Minerals policies more than the company's because we're intimately involved, whereas a company as such is an entity that isn't always intimately involved in the operation but the Department of Mines and Minerals is, so we have made a policy of tidying up and back-filling whenever possible and keeping to single approaches... this sort of thing, which is not always possible.

One of the things that I wanted to relate while I was here is that at one time we made a prospect that was abortive and so we went back and filled it in. We had stockpiles. This was in Badlands topography, so it was sort of brushy, bare clay on bare clay hillside, but this was a mark on the country so we spread the material back out; knocked down the sites of any pits so that it was not much different from the surrounding topography, except that it had no vegetation on it. We waited for a year and nothing started.... raw bedrock clay doesn't support vegetation readily. So I communicated with the three obvious departments of the provincial government asking for assistance. We wanted to do something. We didn't exactly get a "no" but what we got was passed around the three departments, around and around, until finally we gave up from lack of cooperation. We would have revegetated this area, personally, the mining crew and myself, by hand if we could have. To show the futility of an operator undertaking this kind of study, our studies indicated that we had to make a start with either Russian Thistle or Rose Bushes. Now, how is our ceramic and mining personnel to undertake a long-range program that started with something as remote from the final result as that? This requires the cooperation of government agencies.

DR. WALTER TROST

I'm interested in your comments just now. How long ago was this?

MR. L.O. LINDOE

That particular instance was in about 1960.

DR. WALTER TROST

What is the state of that terrain now?

MR. L.O. LINDOE

It is plainly visible from five miles away as being still bare ground. There is permanent growth of wild roses and some weeds. I think there is going to have to be enough vegetation growing to encourage birds in migration to stop and feed in it before even enough wild roses are going to be planted because the birds are going to have to plant them. My system doesn't subject them to the necessary acids.

DR. WALTER TROST

Are there any coal, sand or gravel deposits that lie co-incidentally with the area that you may be under-mining for clay?

MR. L.O. LINDOE

Frequently there are. I have one coal seam situation that you will be pleased to know is in Saskatchewan and not in Alberta. But here we have a first-class example. We have to waste the coal. There is no choice because our circumstances don't take into account the use of the coal. If we were to recover it, it would sit on the hillside and slack to garbage and it would just be an added cost that nobody would ever pay for, but, too bad, there's about five years of coal that goes over the hill.

DR. WALTER TROST

Your clay may be found either above or below the coal measures?

MR. L.O. LINDOE

There are the circumstances across our operations through Alberta, Saskatchewan and Manitoba to say this. There are other clay materials that are not presently applicable to the industry's need that I know will eventually be valuable. There is no authority within our reach to save this material, spend the necessary money to save it, unless there is some means of the company feeling that it is justified to save it for somebody else. Of course that doesn't exist now.

DR. WALTER TROST

Are there reasons why it would be impractical in principle to co-ordinate the usage of these various products, say coal, clay, sand, gravel, if they were to occur simultaneously above each other?

MR. LINDOE

I think that it would be quite easy to cooperate. One such cooperation was suggested in Edmonton in the Wabamum strip mining operation. The brick plant in Edmonton northwest was mildly interested in one of the clays being stripped out from between the coal seams and not for any management reasons but probably for quality of the material. The idea was abandoned but I think an arrangement could have been made at that time to recover that clay. Some very long term decisions have to be made about saving a presently not indicated material. We do have instances where we have done this and it has paid off handsomely. In 1957 just as a mining department we stockpiled part of the over-burden separately and did this for about six years before the industry became convinced that this was valuable material and finally, this 30,000 tons of otherwise waste, was put into use. The concept is valuable but it requires a lot of long-range consideration.

I would like to point out some similarities here. I prepared a number of things that I wanted to say here today and most of the things have already been said. There are a number of things that Mr. Jamieson said about the Coleman Collieries situation that you have seen reflected in the general comments that Mr. McLaughlin brought forward. I was asked to come to bring the point of view to the presentation late yesterday afternoon so I just put through the stuff very quickly. The first thing that I noticed in this position statement was that Items 2.1, 2.2 and part of 2.3 were very satisfactory, very desirable statements of policy and of principle that nobody could possibly find any objection to, because they were obviously the wish and intent of everyone: the producers, the people of the province if we're separating the people of the province out from anybody else, and the government. We must all wish to follow the principles laid out there. But as soon as we go past this point and enter the mechanics of how we go about it in this position statement, it becomes very, very restrictive from a particular point of view. Now this disturbed me when I encountered this. I thought: "Here we're going to have a bunch of quick restrictions that are going to have to be corrected by amendment year after year until finally they've all been weeded out again". We have a number of these already in the books regarding mining where some of the amendments have not yet taken place but they will have to come. But in listening to the presentation I get a better feeling that people are talking about cooperation rather than a specific tight set of rules. There is just no way that any of the factors involved in these opinions are going to be happy with tight, fixed rules; perhaps all for different points of view. I suspect that the government's point of view in the end is going to be very close to the producer's point of view except in the details of who spends what money and from where. I don't feel so badly about that situation now, but I would like to re-iterate that I am pleased to have been able to be here to state this. I feel that the position statement is still a long ways from understanding what the people of Alberta want done to accomplish their end as a generalized statement through

their government. I cannot possibly see three government departments all agreeing on certain restrictions indicated here because they are going to conflict with one another. And certainly from the government there will have to be some facing of the general need, of not just the people we hear from but of the people we don't hear from. I will be pleased to hear how this is going later and certainly I would feel that if somebody is missing something that it would be my duty to start crying out. I should point out that I'm not looking at this simply from a clay-mining point of view. My pappy, who is still alive, held the position that Mr. Jamieson holds now, 40 years ago. He was the Chief Engineer for the two mines in Coleman and was later the General Manager for the two mines. I worked underground in Coleman for two years and I have been involved in geology and proposals of mines in foothills. So I'm not concerned simply with clay mining. I'm concerned about the whole mining situation. Some of you also may have heard of me as an artist. My concern for aesthetics is as great as any conservationist and it has been necessary to work within those circumstances. I have encountered no restraint in the industries I've ever worked for in regard to the preservation of aesthetic matters.

DR. STUART B. SMITH

Would you give us the actual geographical sites of both the active and inactive quarries, the tonnage of mine products per year, the value of the marketed products, and the number of jobs involved in the industry?

MR. LINDOE

The quarries that we will be discussing here are producing about 120,000 tons of clay per year. I haven't been intimately associated with this since 1967 and we have a different distribution and so, 90,000 tons per year of material that will be arbitrarily devaluated because it's all used internally ... no, not quite all used internally. I am the owner of the smallest resource industry in Alberta, Plainsman Clays, and we use quite a bit of clay, some of which we purchase from Medicine Hat Brick and Tile and so we have established a price that is somewhere around a dollar-and-a-half a ton. This will do for a figure now. The jobs that this makes possible, if we go down through the whole process, that is, converting raw material into a final product that may be used later. There are about 300 immediate jobs per year plus a bunch of secondary ones that are half directly applicable to this. That is, there wouldn't be nearly as many of other kind of jobs available if it were not for the clay industry. So in this case the clay industry is converting minerals of rather low in-the-stockpile value into a very high relative value of jobs and products, most of which are completely circulated within Alberta.

DR. STUART B. SMITH

Would you agree that this is relatively labor intensive type of operation, rather than capital intensive?

MR. L.O. LINDOE

Yes, I would say so. There are some parts of it that are a bit capital intensive, actually the mining operation itself is handled by Mr. Belanger back there and two helpers with two big machines and then the contractor rents a number of trucks. But within the company these two big expensive machines do the work, but from thereon it gets progressively more and more labor intensive.

DR. STUART B. SMITH

In your mining operations have you run into any bentonite deposits?

MR. L.O. LINDOE

Yes, but not suitable bentonites for the purposes indicated. I have encountered one but it's in such a place that it should never be known about because it's within a park. It's jim dandy. Did I answer your question?

OLDMAN RIVER REGIONAL PLANNING COMMISSION
REGIONAL PLANNING AND THE REGULATION OF SURFACE PLANNING

PRESENTED BY MR. J. NICHOLSON

"Our grandchildren may not be entirely enthusiastic about our unquestioned presumption that the mountains should be lower and the junk piles higher."

- State Representative George Darrow, Montana.

"... wealth and power were built, and to a large extent still rest, on the exploitation and industrial use of ... mineral resources. This is a process which inevitably makes a mess of the land. Our forbears, for the most part, left the mess as it was: either they did not mind it, or they found the task of cleaning it was too difficult or too costly."

- "Derelict Land", Civic Trust, London, 1964.

REGIONAL PLANNING AND THE REGULATION OF SURFACE MINING

While it can be assumed the extraction of minerals by surface mining will continue to play an important role in the economy of this Province, it is becoming increasingly obvious that traditional assumptions about our priorities in this area must be reviewed. Yesterday's economic imperative must be reconciled with today's environmental concern. Any analysis of this implicit conflict in land use should consider the following factors:

1. Cultural values - what environmental standards will be considered appropriate in the 1970's and beyond?
2. Economic limitations - what is the additional (or marginal) cost of extracting minerals in such a way that unacceptable damage to the environment is avoided?
3. Environmental planning studies - what are the potential uses of a given region and, conversely, how much abuse by man can it tolerate?
4. Implementation of programs - what changes in legislation and administrative mechanisms will assist in the achievement of designated land use goals?

Although any one of these invites extensive comment, this report will, after reviewing the first three factors, focus on problems of implementation in the context of regional planning.

Acceptable levels of environmental abuse are as much a reflection of a society's cultural values as of any precise indices of contamination or blight. With today's widespread concern for the quality of the environment, not only are existing controls over land use being revised and upgraded, but previously unregulated activities are also being scrutinized. To account for this, it could be postulated that as awareness of environmental and ecological problems increases,

dialogues evolve among and between different interest groups. This in turn leads to a more sophisticated understanding of the problems by all concerned.

One effect of all this is a reassessment of the relative costs and benefits of alternative land uses. Where surface mining is concerned a comparison of the costs and benefits of mineral extraction versus recreational and conservation uses is particularly relevant. Two levels of concern can be identified. First, if exceptional recreational sites or rare and unique ecosystems are involved, should they be treated like endangered species and strictly preserved? Second, in areas where surface mining activities might be defensible and adjacent lands and water-bodies can be protected, should reclamation of the land be insisted upon? The prevailing sentiment seems to be that it should. If increased mining costs are cited as an issue, there is considerable evidence that the expense of reclaiming strip-mined land need not be prohibitive. In the case of coal mining, one authority estimates the cost would be between two cents and twenty-five cents per ton of coal extracted.¹ The exact amount would depend largely on the topography and the timing of reclamation activities. The latter is a vital factor in surface mining reclamation. If the job has to be done after mining has been completed, the dollar costs are two to three times higher.² It would appear that the costs in terms of damage to the ecology continue to grow the longer reclamation is deferred.

Predicting and assessing the impact upon the environment involves a third factor, environmental planning studies. Extensive, planning-oriented research of a region and its resource potential are necessary to provide the data upon which informed land use decisions can be based. In Alberta work in this aspect has been initiated under the, "Foothills Resource Allocation Study." An interdepartmental group is carrying out an inventory and evaluation of the resource potential of the

the foothills area of Alberta. Under their terms of reference resources are considered in the broadest sense of the term and include everything from mineral deposits to wildlife habitats. As suggested earlier, it is not feasible to specify absolute criteria for environmental quality; any standards employed will, in fact, tend to reflect the dominant cultural mores of the times. It is however, possible to predict some of the environmental effects of alternative land uses and then relate these to social and economic values. In this regard the results of the Foothills Study should prove to be a valuable input to future land use planning in the regions involved.

A corollary of the above is the introduction of new legislation to permit more comprehensive control of resource uses, and to this end the proposed legislation recently outlined by the Department of the Environment is commendable. It appears to emphasize five main areas: (1) the promotion of balanced resource use, (2) an emphasis on the prevention of further environmental damage, (3) placing the onus on the developer to prove his proposed activities are acceptable, (4) consequential resource use decisions to be preceded by public debate, and (5) all affected agencies and departments are to be involved in administrative decisions. It is suggested that this last proposal is crucial to successful land use and resource allocation planning. As the preliminary report of the Foothills Study noted:

"Practice appears to reflect a preoccupation with single resources and the present structure of resource legislation therefore often seems to be decisive and to inhibit planning, especially from the integrated land use aspect."³

It is a moot point to argue where the responsibility lies for initiating action and carrying out the necessary measures, although it has been suggested:

"A convincing 'operational' reason for fixing primary responsibility on the province is that, in this nation of vast area, only the province can give adequate leadership to devise the regional structures and procedures which are essential to all resource-planning and community development."⁴

In some situations, "regional approaches are in effect decentralization of uniform (policies) laid down by central government."⁵ An important step in this direction was taken two decades ago when Alberta introduced the first regional planning legislation in Canada. More recently other provinces have taken similar steps, each one adding its own refinements and innovations. They also have recognized that comprehensive regional planning can create a framework conducive to the achievement of social, economic and environmental goals. The basic philosophy underlying the planning process is the anticipation of problems rather than reacting to crises.

Decisions on land use often affect or are affected by a multitude of public and private actors. These actors may include government departments, municipal councils, land owners, developers and neighbouring residents. One of the well-established roles of a planning agency, whether urban or regional, is to collect, review and comment on their reactions, then disseminate the information to those responsible for particular land use decisions. It is suggested that this role which could and should include a review of any surface mining or land reclamation proposals is a legitimate function of a Regional Planning Commission as this is the only existing agency with both regional scope and elected regional representation. In this respect, surface mining is no different from any other land use proposal. Its economic ramifications may be national or even international in scope or they may be as mundane as those of a municipal gravel pit. In either instance, the environmental impact is likely to be regional in scale. For these reasons, a regional planning agency can and should have a key role in the administration of any new legislation.

It can be inferred from the substance of the new legislative proposals that a major ingredient in resolving the problems created by surface mining activity is the introduction of new legal and administrative ground rules that will help to

optimize the mix of land uses and resource allocation. The best way to prevent implementation of these proposals is to further encourage the compartmentalization of jurisdictions and agencies involved. The potential effects of surface mining are too diverse, too persistent, too complex, and too overwhelming in their impact on the environment for its regulation to be relegated to a single government department or public agency. In regional land uses, as in urban land uses, the agencies involved should be concerned, but their concerns should be coordinated.

FOOTNOTES

¹. "Sharp Conflict on Strip-mine Reclamation.", p. 298, Science News, May 1, 1971.

² Ibid.

³. "Methodology for the Foothills Resource Allocation Study: Report No. 1.", Department of Lands and Forests, Edmonton, 1971, Section 3.1.5.1.

⁴ H.A. Hosse et al, "The Multiple Use of Resources Policy-making and Administration" in "The Environmental Reader", Anthony DeVos et al, eds., Montreal (1968), p. 205.

⁵ Allen V. Kneese, "Regional Water Quality Management", in "The Environmental Reader", Anthony DeVos et al, eds., Montreal, (1968) p. 192.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

I was very interested in your comments on environmental planning and I'd like to give you an opportunity to sum up your view as to the role of the Regional Planning Commission in regional planning related to these matters, including strip mining.

MR. J. NICHOLSON

At the moment the only official authority that the planning commission has is that they are the authorities for sub-division of land but also "formally and informally act as a coordinating agency". Using sub-division of land in this specific instance: An application is received by the Regional Planning Commission and we automatically approach all agencies, this includes the municipality or municipalities involved, the Department of Health, the Department of Highways, etc. and solicit their comments on it. Rather than merely assuming that it doesn't concern them we check with them and then we summarize the comments and on this basis, as well as on planning considerations, we make a decision. What we are proposing is simply a logical extension of this: That the role of the planning agencies well established in urban areas (again they perform largely a coordinating role to focus concern of all the different people that are involved). We feel that the regional fact has to be recognized; to use as an analogy - in sociology there is a study known as urban ecology which instead of looking at natural eco-systems, treats an urban area as an eco-system, a complete integrated system where any action particularly where land use is concerned has implications and effects on other land uses and other factors. It's moving from this into a regional context now that, not only developers, mining companies and others, but also the people at large either directly through recreational pursuits or precariously through knowing the deep wilderness areas are there, that regional eco-systems that include man are occurring. Before, a minute percentage of the total land area was dominated by man. His occasional excursions into the hinterland didn't make much difference. What is very rapidly happening is that he is having an influence on the whole environment and he is discovering that he has to preserve wilderness areas or else there won't be a natural eco-system left. These are the more idealized concerns of the conservationists but getting down to the nitty gritty of it, we are concerned with how this is implemented.

Another example is that in the planning department, in our library, we have texts on planning and related subjects but on every one of our desks we have the relevant provincial statutes. We find we look at these far more often than we look at our planning theory and we're very concerned about how these things are implemented.

DR. WALTER TROST

You feel that these definitions of roles should be included in the legislation?

MR. J. NICHOLSON

I think the problem should be recognized. I think this is the main thing and this is a point that was very well made by the representatives of industry. In our case we'll receive letters that have been forwarded from a completely different agency because the person wishing to apply for development, or wishing to this or that, didn't know where to turn. Sometimes we have to forward them on to others and we think more recognition should be given to this problem of coordinating and implementing these things.

DR. WALTER TROST

In respect to the cost per ton that you were quoting for reclamation, what spread of terrain was involved bearing that we're looking from prairie to foothills to mountains? Did these figures cover such a wide variety of terrain?

MR. J. NICHOLSON

By implication in the written Brief, we cited the references where we obtained this information. In the narrow spread of .04 to .10 cents a ton, this was a large brochure put out by the U.S. Department of the Interior and based on their experience where reclamation has been carried out. And the other comment where it ranged from .02 to .25 cents per ton was cited in Science News last May, 1971.

DR. WALTER TROST

The terrain was not defined?

MR. J. NICHOLSON

Particularly in the last one I think he tried to use the widest parameters that were conceivable, this would range from .02 to .25 cents in extremely difficult areas where there is perhaps a great deal of over-burden or other difficult problems.

DR. STUART B. SMITH

The role of the Planning Commission, as I understand it, is to adopt a completely neutral stance in the first face-up to a problem and to attempt to draw points of view into focus before any recommendations are made.

MR. J. NICHOLSON

I would say that was the case. We don't set ourselves up as an ultimate authority, of any kind, that our area of expertise is land use and the spread effect, you might say, of land use on neighboring land uses and by extension on the whole social and economic fabric of society. This is as much a tradition as anything, in planning as to any kind of planning agency. It is to draw together all points of view, and to disseminate them to those who do have to make the decisions.

DR. STUART B. SMITH

As a crawler to this, do you find that industry, government and other segments of society respond about equally to this neutral stance? Do you see an increasing involvement of everybody making an input? Does it seem to be critical in this question?

MR. J. NICHOLSON

I think there is increased awareness of a need for, particularly, a regional outlook and regional point of view, but we feel that there could still be more awareness. Our main thrust is that the problem should be recognized. We are not proposing answers, we are proposing that the problem exists and we are not sure that enough people recognize this or that it is as urgent as it is.

MR. BILL NICOL

Mr. Chairman, Members of the Authority, Ladies and Gentlemen. I'd like to take this opportunity to thank the Authority for giving us the opportunity to speak today. I can assure you that there will be quite a bit more comprehensive report tomorrow when you get to Edmonton again from our office there but, I think, realizing the impact on Southern Alberta, particularly in the area of watersheds and things along this line, I felt that we should have something in this part of the province as well. We realize the fact that energy is playing a vital role in the economy of Canada and Alberta, and also the fact that the things that are required to develop this energy are also an important part of agriculture. For example: In the area around Lethbridge we have about 686,000 acres of irrigation which is competing by and large with the cities at the present time for water and I suspect, as the decades progress, this will get even worse and the economic implications on agriculture can be magnified quite a bit as the cost of input goes up. I think, to point out right now the economic factor in the Lethbridge area for example, the area immediately adjacent to Lethbridge in the L.N.I.D.: If this area was specifically dry land the revenue would be somewhere in the neighborhood of about \$16 million dollars. At the present circumstances with irrigation we are talking about 73 million. This is just a small portion of the total irrigated area and it plays quite an important part in the city of Lethbridge and also the surrounding small towns. I realize that the mining operations require removal of over-burden and other obstacles at the present time but the watersheds are very important to agriculture, not only in irrigation but also into the people in the foothills where there can be run-off from these mining operations, etc. and changing location of streams and things like this which can have some real hardships on the people concerned, supplying water to livestock and so on. Some of the causes of erosion that are more applicable, I would guess, in this area will be the wind erosion. I think most of you are familiar with the winds that we have here and this is causing a lot of concern in areas where strip mining is started and for one reason or another people have left and it hasn't been cleaned up. The over-burden is left in piles and things along this line and these are causing great concern. By and large most of these are located fairly close to streams and a lot of this stuff is running off into rivers and streams and also affecting the livestock production. I think also we were talking about mining: One other area that I feel that we're going to have to look into an awful lot in the future is gravel. It's becoming quite a problem with the ever-increasing need for gravel for roads and so on. We have to look at this as another aspect of surface mining and also some regulations will have to be designed for this area. I think when we discussed the area of strip mining, also the replacement of the topsoil, realizing full well that there can be a biological upset as a result of moving this. I think we have to try and replace this to the best of our standards at the present time so that this land can be, for agricultural purposes, put back into good use and not affect the surrounding district. Re-seeding of some of this can be affected by the climatic conditions as pointed out by

some of the previous speakers but I think, on the prairies here for example and also in the flatter lands, we have an opportunity to re-seed these things and control the weeds that become the result of these things being left open. I think also we will have to look at the planning over a period of a longer time than just the immediate generation that we are faced with because I think we've inherited something here that we should be able to pass on to people in the future generations. I think also the economic impact there, for example, the coal has on the export trade in the world. This by and large affects agriculture again because we've become part of this trade pattern and I think we have to establish, over a period of years, some of the priorities as to the effects of these type of operations and also the scale of values that we can attach to them. I think over the past years we've dealt specifically with economics in these areas, and today I think we have to look at all the other aspects such as environment, etc. to help plan for the future and protect the future generations. Thank you very much.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

Do you have information as to whether land now under irrigation does have stripable coal; coal that can be extracted by strip mining techniques?

MR. B. NICOL

In some particular areas it can. There have been two or three operations just north of Lethbridge and in the Taber area where there is some irrigation. These are located off the flat portion of land and more along the rivers at the present time.

DR. WALTER TROST

So that there are not only coal measures underlying land that is under irrigation but in fact there have been examples of strip mining in irrigation country, is that right?

MR. B. NICOL

Right.

DR. WALTER TROST

In addition to taking that land out of cultivation for the time, were there any other direct difficulties associated with keeping the water up?

MR. B. NICOL

In the irrigation area the water doesn't really pose a problem as far as the water table itself is concerned because we have sufficient supplies at the present time. But I think the other implication is the fact that some of this land is being used for farms and when it's taken out for mining or something like this, in some cases this might not be an economic unit again. This may at some time force the farmer to leave and as a result find some other job.

MR. PAUL BABEY

You raised the question of gravel pits and I was wondering if you would expand on what you had in mind, whether a reclamation program for gravel pits similar

to what is being proposed for the strip mining of coal?

MR. B. NICOL

I think we have to look at these things because I'm located right in an area where there is a large amount of gravel pits and it seems to me that these things are dug out and when there is no longer need for the gravel they are just abandoned. There has been no reclamation associated with it to very great an extent. In some cases the particular people involved have done a little bit of their own work but it's been very limited and what I've seen of these operations, a lot of this stuff is just pushed over the river bank and it's gone with the next high-water line. These are some of the problems that I see in this. A lot of these areas are associated with rivers and things along this line, which people could use for recreational areas if they were properly reclaimed in the future.

DR. WALTER TROST

Is there an example in which a strip mine has come into irrigation country and then being reclaimed to a point where it was once again under cultivation in an irrigation system?

MR. B. NICOL

Not to my knowledge. I couldn't say for sure.

2.8

SUBMISSION TO THE ENVIRONMENT
CONSERVATION AUTHORITY ON THE
ENVIRONMENTAL IMPACT OF STRIP
MINING IN ALBERTA.

Hearing - Wednesday, December
15, 1971.

Civic Sports Centre, Lethbridge,
Alberta.

SUBMISSION OF THE CITY OF LETHBRIDGE

PRESENTED BY J.A. HAMMOND

The City of Lethbridge desires to be recorded for the purposes of this Hearing as being strongly opposed to any activity which may environmentally affect the water shed of the Oldman - St. Mary River System.

The City of Lethbridge has not had the opportunity or the availability of any scientific report in respect to strip mining in the water shed area. As a result, much to be presented is based on conjecture and observations of what has taken place elsewhere. These observations have not been favourable.

Perhaps the City's concern is best stated by quoting from a report of the City Manager made to City Council on October 25th of this year, as follows:

"There is much dialogue recorded in the annals of our history concerning the required amount of flow on the Oldman River and the required amount of license necessary to safeguard the City's future growth and development. As noted in the above, 18,250 acre feet annually calculates out to be 25 cubic feet per second, which we are allowed to take under License. In 1949, the City is reported to have recommended that 75 c.f.s. be allowed. Later in the same year, when Mr. Somerville joined the City, it was requested of the Director of Water Resources that 125 c.f.s. be allowed under License. According to a report prepared by Mr. S. R. Lamb, the Director of Water Resources agreed that this requirement was reasonable. It is noted in Mr. Lamb's report that the City has the authority to apply for cancellation of irrigation rights in order to increase the City's License to take water from the River. This reportedly would be done under the provisions of Section 10(4) of The Water Resources Act.

"Nevertheless, it really does not matter how much the City or the irrigation districts or all other users of water from the River are allowed if there is not sufficient water in the River to guarantee these needs to a point within the foreseeable future. This, then, becomes the principle problem--to guarantee sufficient water to meet all essential needs according to the priority schedule mentioned earlier on in this

report. It is important that efforts be made to guarantee a more average annual flow throughout the months of the calendar year on the Oldman River that will guarantee these needs. As with the North Saskatchewan River, that has a daily maximum flow of 164,000 c.f.s. down to a daily minimum flow of 220 cubic feet per second, the Oldman River recorded maximum flows of 33,800 cubic feet per second on June 30th, 1969 and daily minimum flows of 180 c.f.s. on December 10th of the same year.

"With the continued advance of agri-business in Southern Alberta reflected through our industrial base and, hence, our raw sewage processing, the loading of the Oldman River has become a serious problem with respect to the low flow situation. Augmentation of low flows is required to relieve the potential requirement for tertiary sewage treatment to maintain a sufficiently high quality of water below the discharge of our Secondary Sewage Treatment Plant. The options appear to be several and involve further impoundment structures and diversion works on other streams into the river system that ultimately feeds into the South Saskatchewan.

"In our own particular case, the spiralling use of water, not only for municipal and domestic purposes is compounded by the increasing agri-business in the area, which in turn increases the irrigation use of water.

Therefore, in my non-technical estimation, it appears necessary to very closely analyze the future demands on our own river system to meet municipal, domestic and industrial consumption in the City and surrounding district, while at the same time working with the irrigation districts and affected rural communities to effectively establish the demands that will be placed on this river system in the next 25 to 50 years. For such a project, we do need the help of the Provincial Government to guarantee the vitality, not only of our City, but of our region."

To put it bluntly, the City of Lethbridge envisions a water shortage, not only to it as a municipality, but to the region and specifically to the two irrigation companies operating in Southern Alberta. Anything man made which may in any way interfere environmentally with the City's water supply is to be objected to most strenuously. Without water that is good, clean and can be used at reasonable cost, the City or the area cannot grow or flourish. There can be no planning for tomorrow. The future without vision and planning cannot exist as we have known it. It is for you--the planners for tomorrow to see that our children's children can share in your wisdom of today.

The City would like to express several concerns in respect to coal strip mining operations. Firstly,

is the hydrostatic change in the water shed area due to the removals of natural plant growth? This has been natures method of stopping erosion, of allowing the rain and snow waters to gradually ascend the slopes, to store waters so the flows of streams are graduated over a period of time. Without this natural plant growth, we envision a rush of rainfall and melting waters flooding the normal stream channels, carrying with it the loosened materials, eroding the banks and choking the existing streams with debris, mud and muck. This may mean that not only will the existing dams now controlling the water flows soon silt up, but that they will have to be made larger or have more ^for them in order to receive the sudden onslaught of all the draining waters at one time. And, who would bear the additional cost? It shall be the people of this Province and Canada.

Secondly, we are concerned with what will be deposited into our waters by the run-off from strip mine operations. The present Coal Mines Act (Chapter 52, R.S.A. 1970) does not appear to deal with the potential problem. Section 358(1) states: "No water shall be allowed to accumulate in a strip mine"; and sub-section (2) states: "Notwithstanding sub-section (1) if the Director is satisfied that it is in the public interest to do so he may upon application permit the accumulation of water in a particular case upon such terms and conditions as he may prescribe."

If the Director has dealt with the problem, we can only state we are not impressed. We refer you to the attached photographs. You will note that the Coleman coal operations on the head waters of the Oldman River have no such design. The only plan appears to be to rip the mountain face, to get the coal out as economically as possible, to let the waste be disposed of wherever it is easiest and to hell with the natural water courses, the streams, the vegetation, the potential floods, the fish and animal life and the beauty.

It is to be suggested that these operations have their parallel throughout the world wherever similar types of operations have been permitted. Are we to be proud of Kaiser Resources Ltd. operations at Natal, B.C., twenty years from now or will it look like the existing remains of Crow's Nest Pass communities? We can only point to the shame of the Estevan - Bienfact area in Saskatchewan. The much researched Appalachian regions of the Eastern United States. We know of nowhere where such operations are looked on as operations of pride. Nor is one to be impressed with the Province's past attempts at controlling pollution. The Board's attention is directed to the Gulf-Shell sulphur extraction plant at Pincher Creek and to the industrial wastes which have been put in the North Saskatchewan at Clover Bar.

It is noted that Application No. 5968. to the Energy Resources Conservation Board by Calgary Power Ltd. is for two additional 375 megawatt electric generating units at its Sundance Plant at Lake Wabamun. If approved, this will mean 50 long tons of sulphur dioxide, a like amount of oxides of nitrogen and 5 long tons of particulate matter will be discharged into the atmosphere per day. One is not told what the present plant discharges. Is one to expect any different treatment in respect to coal strip mining operations?

May it be pointed out that certain streams in British Columbia where surface strip mining operations have been permitted are now devoid of fish. Streams which had once been a fisherman's paradise. In the Appalachian region, streams are so contaminated that not only fish but plant life has been killed. If this is to be the effect on the streams of Alberta, may we question how long it is before the waters may be used for recreation, irrigation or for drinking in our homes?

What are the deleterious matters we may expect to be leached from the waste materials of a strip mine operation? This we have never been informed. What provision has been made for holding areas of waste products so that even a hundred years from now

one may not worry? In the Coleman and Kaiser operations there appears to be none. It is appreciated that this may not be of immediate concern, but this was also true of the first automobile, the first industrial plant, the first pulp and paper mill, the first open sewers diverted into our streams. Do we have to wait until dire results happen before action can be expected? Will it not then--as so frequently has happened in the past and now, be too late. Why not stop this potential danger now?

Of interest is a recent editorial in Life Magazine by Edmund Faltermayer "Taming the Strip-Mine Monster". In this article he points out the difficulty of controlling strip coal mining operations by a government once established. "Cynics will greet the news that there is a state government which puts the screws to the strip mining industry." The only example that he gives where it is being done is Pennsylvania where he feels an effective job is being done. However, here there is considerable natural growth, much clay overburden and low profiles. This is in contrast to the Rocky Mountains where plant growth is not prolific, where the coal seams outcrop in shale and limestone, and where there is high, steep profiles, with the coal seams frequently intersecting the total mountain, sometimes at 90 degrees. He goes on to state:

"The foes of strip mining take little comfort from the Pennsylvania experience, which to them comes from a unique combination of broad public concern and honest enforcement. Meanwhile, they say, the damage goes on. Stripping is just getting under way on a large scale in such western states as Montana, Idaho and Wyoming. To appreciate the freebooting atmosphere that still prevails in most states, cross from Pennsylvania into Ohio as I recently did. There, under a reclamation law that is an insult to the intelligence of the state's citizenry, companies are leaving sheer vertical highwalls, some of them 150 feet high and close to busy roads.

"Obviously something has to be done, and quickly. Pennsylvania's reclamation standards, which may soon be tightened further, should become the minimum for the whole nation. The Nixon administration has proposed that Congress set federal standards for reclamation, to be applied within two years if states don't enact sufficiently strong rules in the meantime. But the states should not need a prod from Washington. Public indignation is rising, and a whole industry is, in a sense, on trial for its life."

If strip coal mines are to be considered in the Rocky Mountain - Foothill water shed, may it be suggested that before further work be allowed or even considered

that the Province conduct immediate research on the potential problems. Lets learn if reclamation is possible. Lets learn if there is a leaching of deleterious materials into our water courses, of the problems of erosion and if the state of nature can be returned to a form that is compatible with future recreational and tourist potentials. On the basis of this information only can proper regulations be established.

Thirdly, the City of Lethbridge is concerned about the loss of recreational areas, not only to its own population, but the growing population of the Province, and now the population south of our border.

The Rockies have been world recognized as one of nature's gifts to man, a region of great beauty, full of wild life, of clear streams, protector of the Saskatchewan - Nelson water shed basin. It has been so recognized that our National Parks have become North America's top tourist spots. Already our National Parks are experiencing over crowding.

Reference is to be made hereto to a report prepared by the Oldman River Regional Planning Commission on the Crows Nest Pass sub-region. The material specifically referring to tourism is in booklet # 3 "Regional Development and Urban Renewal". Copies of pages 13 to

24 are attached to this submission for your further consideration.

Of note is that in 1968 the Banff - Waterton area had an estimated 5 million tourist visits. Stated too, is where there has been coal mining in the Crows Nest area the area is blighted "whereas the national environment of the National Parks and to a lesser extent the Forest Reserve have been preserved and are of a high quality from a scenic point of view."

Pointed out is that the region of the forest reserve and Crows Nest Pass had had no serious attempts at tourist development. Potentials listed are mineral springs, historical town sites, dude ranches, mine tours, ski resorts, etc. "In a sense, the Crows Nest Pass is a focal point of tourist inactivity in the midst of one of the most popular tourist oriented regions in North America."

"If urbanization in the two National Parks complexes is indeed reaching an undesirable and irreversible level, and further, if the preservation of the National Parks as sanctuaries of nature is a legitimate social goal for Canada, then the inequitable distribution of tourist activity in the Rocky Mountain Region is a regional problem with national implications which could be solved within a regional context

(foothills - forestry reserve - Crows Nest Pass area) with national assistance and co-operation." Further the report strongly suggests "that a policy for development aimed at attracting tourists to the study area must be formulated and adopted." At a recent Minister's conference Dr. Woods, Director of the Provincial Parks estimated that 22 million people would be using provincial parks by 1980. The National Parks people at the same conference stated that very soon the only way a person may get into a National Park would be by a reservation. In short, gentlemen, those mountains and hills which form the water shed to the Saskatchewan - Nelson River Basin are now needed for recreation and tourist development.

In terms of money to Alberta, may we suggest a much bigger return will come from tourism. In 1970, there was \$240 million in direct expenditure of tourist dollars spent in this Province. The average Canadian growth rate for tourism has been between 8 to 10 per cent per year. In contrast, Southern Alberta has experienced a 23 per cent growth of tourism in 1970 and 26 per cent in 1971. The Honourable Robert Dowling, the Provincial Minister of Tourism estimated that in 4 years it will be the largest earner of dollars in the Province. Of note is that it is highly labour intensified, being the third in labour numbers for the Province.

This is in contrast with the projection of the coal industry. "Economists say that the full operation (of coal export industry) will mean 3,000 new jobs, new and expanded service industries, and yearly expenditures of more than \$40 million on labour and materials--most of it in Canada." (Alberta Business Journal - September 1970 at page 75).

Tourism and recreation are not compatible with surface or strip coal mining. Preference must always be given to that which provides the greatest return to our Province, not only in terms of money, but in a way of life which provides not only for today, but as a legacy for those who will share the renewable resources of tomorrow.

It shall always be argued that surface or strip coal mining in the foothills of the Rockies will be good for the Alberta economy, that it will generate jobs, and have the effect of revitalizing a depressed area. In the short term, we may agree. In the long term, we would disagree, in that the natural beauty and recreational nature of the area are constantly renewable resources. These do not just create jobs for now--but forever. Strip mining is a one-shot approach. And up to now has conflicted completely with the tourist and recreational potentials of tomorrow.

Questioned is even the economics of strip mining on a short-term basis. It is noted (The Financial Post, November 20, 1971) that the McIntyre-Porcupine Mines Ltd. - Smoky River coal operations had a net loss for six months to September 30, 1971 of \$5.4 million. Kaiser Resources-Elkview Coal Mines have indicated like losses. No longer are the coal mines labor intensified. The work is now done by 54-cubic yard walking drag lines, 200-ton trucks, 8,599 foot long conveyor belts, unit trains, all designed to reduce the labor force to a minimum. The jobs are to be found south of the border in making the machines--not here. Certainly there is no benefit to Alberta in a 10 cent a ton royalty.

And will the coal industry last? Press reports indicate that our major purchaser, Japan, is now looking to China as future suppliers with its low labor cost and shorter hauls. May we again visualize todays new communities becoming tomorrows ghost towns as the economics of the ventures causes the operations to be shut down. What then will hold the labor force if the tourist and recreational potentials of the area are lost?

It is appreciated that there exist, especially in North America, a shortage of energy and in the world a shortage of coking coal. However, "necessity is the mother of invention" and by making our resources

available cheaply to the world, we may not only be doing our country a disservice, but the world. In this day of pollution crisis, and ecological breakdowns, whether here or elsewhere, it must be remembered we are all passengers on this "spaceship earth". May it therefore be argued that by limiting access to our cheap fuel supplies today, that cleaner, better, and cheaper sources of energy shall be available for tomorrow.

Nor will the demands for our coal be necessarily lost. As our forest becomes depleted, as new technology evolves, may it not be possible that this resource may become the building blocks of tomorrow. That it could provide the basis of a new and exciting chemical industry, extracted in keeping with our ecology, creating jobs here in our Province for our growing labor force.

Legally speaking, may it be questioned if the Province of Alberta has the right to permit any operation, even a coal strip mining operation which may interfere with the water shed of the Saskatchewan - Nelson River Basin. What are the rights of other riparian users downstream, be they in this Province or in Saskatchewan and Manitoba? Attached to this submission is an attempt to summarize the law of water rights as it exists on the Oldman and St. Mary's Rivers. In reading it, one can only be amazed at the complexity and confusion that exists. In view of the recent case now before the

Courts in which the Government of Manitoba is suing two firms in Saskatchewan for mercury pollution to Lake Winnipeg, it is likewise questioned if the two easterly provinces may not have like claims, and perhaps against the Province of Alberta, for the potential pollution of waters naturally received from this water shed, by strip coal mining operations.

In summary, it is the position of the City of Lethbridge that it is concerned about any allowance of coal strip mining in the water sheds of the Oldman and St. Mary's Rivers--whatever be the restraints imposed on such an operation by Provincial regulations. Unknown are the ecological implications for today and into tomorrow. Based on observations of similar workings carried on elsewhere and existing abandoned coal strip mining operations now in these water sheds, the City believes it has reason to be concerned.

Further, in view of the large losses experienced by two of the largest operators last year, we fail to see how reclamation work will or can be carried on with any diligence.

The City of Lethbridge does not wish to go on record as being opposed to development and industry in its area, but it does desire to be placed on record as opposing that type which is or may be incompatible

with those presently existing, e.g. irrigation farming, tourism and recreation, and with the future growth of the City. It is believed that no industry should be permitted which can or may jeopardize the existing situation.

Finally, we question the Province's legal rights to grant any permission to industry which may interfere with inter-provincial waters without these downstream provinces being made also a party to such permission. Of particular concern is the City's right to maintain its common law rights against upstream pollutors, and it is strongly recommended that no new legislation take this right away.

Less than 100 years ago our forefathers came to this land in hope and expectation. In that one generation of man, they through their vision and toil established a community with a civilization as high as anywhere in this world. Let not us, the benefactors of this legacy defile their trust through short term approaches, with lack of vision, by interpreting progress with the destruction of our environment. May history record us with wisdom and foresight with a willingness to forego the immediate short term benefits so that future generations may also share in this greatness of this land of ours.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

Would you care to comment further on the very important point you are making here in respect to water quality and the quantity of water available to Lethbridge and to Southern Alberta out of this watershed area. How is it changing now in terms of quality and quantity. On what is your expectation of a future deficiency based; whether on growing demand or on diminishing and erratic supply, or that combination of circumstances?

MR. JOHN HAMMOND

We know that there will be a growing demand on the existing water supply. We can only take that into account and therefore any interference which may affect that future supply certainly has to be questioned. I think we have to realize that this city is only eighty years old and looking backward that isn't such a long time, but looking ahead it seems to be very far into the future. I think that in doing our planning of today we should take that into consideration. We should look in those terms. Under those terms it would certainly appear that there will be a conflict of interests in respect to water in the future. It is hoped that maybe the province will revise its interest in the P.R.I.M.E. Project and we may see the future diversions of water. This can be the only alternative that we can see.

DR. WALTER TROST

Your position here, which is strongly developed against surface mining in the mountains, doesn't take a position in respect to strip-mining in the plains.

MR. JOHN HAMMOND

We are not dealing with the plains at all. I'm sorry that I didn't appreciate that this point was going to be covered.

DR. WALTER TROST

Would you have any desire to make an off-the-cuff comment?

MR. JOHN HAMMOND

We haven't discussed it and I don't think that we'd have any comments at this particular time.

DR. WALTER TROST

You are fairly clear in your view that surface reclamation procedures would not give you sufficient protection against the dangers you foresee in strip mining in the mountains.

MR. JOHN HAMMOND

All we can do, is to point to existing situations elsewhere and also, whenever you view those photographs of what has already happened in our mountains areas and some of our streams. We are not impressed with what has been done and we can only assume that certain things like this must take place in the future unless you gentlemen come through with some very strict and very strong controls.

DR. WALTER TROST

If the coal in the mountains were taken out by underground methods, would that affect the condition you are complaining of?

MR. JOHN HAMMOND

I think that we have found that this in the past has been fairly compatible, especially if they can get a use for the slag from those operations. I think this would be desirable and we appreciate it and accept it.

DR. STUART B. SMITH

On page twelve of your Brief you quote some very startling increases in tourist activity in Southern Alberta. Do you have a reflection of this spending and of this more than forty per cent increase - almost fifty per cent increase - in tourist activity in Southern Alberta in the City of Lethbridge?

MR. JOHN HAMMOND

This is a statement that we got from our tourist bureau. It perhaps can be qualified in that maybe these were a couple of years where there was an over activity and we should not expect a like growth in the future. I think that we can appreciate that there will be growth and it will continue to grow.

DR. STUART B. SMITH

I can appreciate that but the question I wanted, do you have some direct evidence of this; in your motel business, hotel business, and other activity in the city itself?

MR. JOHN HAMMOND

Mr. _____ is here, he can perhaps give us a better expression than maybe I can.

MR. _____ from the floor

Actually I'm Chamber of Commerce not travel information but there has been motel, hotel activity in the city that reflects somewhat an increase in growth. I don't think that you mean to say there will be a fifty per cent increase in hotel or motel business but we have to look at all the segments: service stations, giftwares, restaurants, trade, the whole bit right on through. I think each business whether they are directly related to tourism or not, benefit from it, but I don't know that you could say that we had fifty per cent increase in two years to any one segment. I think this figure possibly, and this is just in general on my part, is related to the number of tourists that are registering coming through they do register and they do spend money. I'm fairly sure this is how it was figured.

MR. WILLIAM MICHALSKY

LINDBRECK, ALBERTA

DEC. 15, 1971

BRIEF to the E. C. A. on strip mining, Gym II Room of the Civic Sports Centre, Lethbridge, Alberta.

I, do not approve of any surface mining, particularly in our mountain country. I have almost nothing to offer in constructive suggestions for the necessary land reclamation in regard to the strip mining of coal.

I mainly wish to indicate my concern and awareness of the complete desecration and loss, by coal mining, of hundreds of acres of beneficial grasslands. Almost no vegetation covers the old coal slack heaps of even the earliest mining in the Crownest Pass. All of my life I have lived near strip mines, Grassy Mtn., Tent Mtn., Adanac, Vicary and some smaller operations and I can realize the futility of restoring the disturbed land to something like it was originally in aesthetic value as well as production.

As I see it, the export of coal is of small benefit to this province other than to provide temporary employment for a few miners. We may do better to put these people on welfare and keep the surface of the land intact and the water pure. Several hundred miles of recently bulldozed roadway, partly through coal seams, in our steep bunch-grass covered mountains does nothing for water quality in the Oldman river drainage.

The old Police Flats pit mine, abandoned about sixty years ago, has recently started to cave in causing craters, mainly in open grassland. These craters are deep and dangerous but likely nothing will be done about them until someone is hurt or killed by stumbling into one at night or what will most likely happen - somebody will drop into one while running a snow machine in the area. The cost of filling these craters will be almost unbearable as others will occur continually.

Certainly all land disturbed by surface mining directly or indirectly, past and future, must be reclaimed. There may be some method of removing, preserving and later replacing the sod of new mining sites. It appears impossible for the original type of native grass to restore itself except on the very smallest areas. I have

observed it takes many decades for prairie type of bunch-grass to grow back into unused narrow roads or even old well ruts. Few people seem to recognize the value of the wonderful and renewable resource known as bunch-grass and it is doubtful there is another grass of equal quality that would readily grow to replace it. Alpine grasses may be much more difficult to restore or replace. Also it is likely much easier to restore with grass than with trees on the highest elevations.

Government legislation should require stripped land be reclaimed without delay but the time limit should be sufficient to ensure a good quality job.

Financial compensation to the government for land that cannot be reclaimed will never make up for the loss. If it cannot be reclaimed it should be left undisturbed.

Wm. Michalsky

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

The craters that you referred to, are these from strip mines or from underground mines?

MR. WILLIAM MICHALSKY

This was an abandoned pit mine or an underground mine.

DR. WALTER TROST

The underground mine was probably operating in quite a thick seam in that particular area to account for the substantial craters, is that it?

MR. WILLIAM MICHALSKY

I guess that's about right.

Mr. Chairman, Ladies and Gentlemen. I feel it is rather presumptuous of me to appear here at all. I am completely a layman, I am not armed with a written brief with facts or figures in regard to stream flow, or other conclusive evidence to support the observations that I would like to make. I would like to commend Mr. Hammond, he made my presentation very easy because he said much more eloquently many of the things that I wish to say. I would like to indicate to you that I have been closely associated with the area under consideration, that in the discussions today have been mainly in the area from the Pass north of the Kananaskis Road. Over 40 years ago we trailed our sheep from east of Lethbridge to the mountains across the St. Mary's River through Standoff across the Blood and then Peigan and right through Bellevue up into the area known as Lil which was one of the very early mining settlements in the Pass. In fact it was anticipated one time that it might be the largest town in the Pass area. Previous to the war there was some difficulty in their coal and in their rights in some land which they were unable to secure and that was abandoned. That isn't what I particularly want to make reference to except I want to establish the fact that we have been very closely associated with what is going on out there and I've observed the ecology and the changes due to mining, lumbering, oil industry, road construction, recreation, and hunting pressure, all these manners. The area which has been referred to today, north of Blairmore about six miles, I think somebody referred to Grassy Mountain, was one of the finest grazing areas in 1927 and 8 when we first grazed it in the whole allotment of the forestry that we had at that particular time. And today since the years mid-60s or early 60s, that area has been abandoned and here is the beautiful

Grass Mountain completely desecrated, great huge black seams and holes exposed. Of course we could go on ad infinitum about the aesthetic values of the mountain area and I can get awfully sentimental about the Kananaskis area, having been there so intimately for so many years. We finally moved into the allotment known as Daisy and Vickory just south of the Gap ranger station. And the present Vickory operation was actually in the allotment which we had for sheep grazing although we did not graze that mountain because of forest cover and the fact that it was a very steep rocky mountain. But I do want to support some of the things that have been said about what this strip mining has done to this mountain. It is about the most dreadful-looking sight. Fortunately from the highway the Kananaskis Road you don't observe the damage, the wounds, but there is one bit of evidence which has not been particularly mentioned. A beautiful stream, Vickory, one of the sweetest fishing streams anybody ever dreamed of, has been completely damaged ever since this operation. I lived every summer for the last 15 years for one to two months at the mouth of Daisy which is approximately three-quarters of a mile from the mouth of Vickory and I can attest to you that Vickory never runs clean in the summertime. And I don't think that any corporate institution, any industry should be allowed to degrade a mountain stream in this manner. I would like to tell you also that a year ago last summer they put a new mine entrance on the north side of Tent Mountain on Racehorse Creek against the advice, Mr. Chairman, of the forestry officials and officials who were asked to confer about their actions. They were actually stopped on a number occasions from doing certain things by forestry officials. They appealed to another department of government, the arbitration board or some other area and went about their business. And that particular mine entrance which they were preparing was very close to south branch

of Racehorse Creek. Unfortunately the day this instance happened, I think it was on Sunday or during the night, the side of the mountain slid down over the mine entrance that they had prepared to operate from, to the creek and now I am here to testify that Racehorse Creek runs dirty a great deal of the summer as well. I have taken very considerable issue with the fact that the road from Coleman up Kananaskis Road, to eleven miles where the first turn-off to one of their first mine entrance was, is the most hazardous piece of road anywhere practically in the continent because of the dreadful coal dust created by trucks with a capacity of 28 to 60 tons. Almost the whole distance is downhill, about eight miles of it and this creates the most dreadful hazard after it becomes pulverized in the dry season in latter July and August so that it is impossible to see anything behind and no way would any tourist, as wonderful and as beautiful an attraction as the Kananaskis drive is, if they knew they had this hazard would they ever drive up that road. I think it's completely inexcusable that the government has spent hundreds of thousands of dollars in the last two years improving that road to haul that coal out and create the kind of public hazard that it is particularly in consideration of the amount of money that is spent to try and improve and prevent hazardous road conditions. All you have to do, if you don't believe me is go there the first week or two in August or any time in the dry season up that road. There are tremendous numbers of trucks, they are good, excellent drivers, I am not complaining about this. This is what I call, these two instances, a complete prostitution of our resources. I am not happy about it, it's just pretty sad. For someone who has been there all the years we have and seen what changes have taken place in these streams, now both Racehorse and Vickory are full of algae and I am not here as a biologist and can account to you why but this is

something in recent years that we didn't observe years previously. This prostitution of the resources in this area was done by consent for a price and the only ones I think we can blame is ourselves, that we haven't made better representation to the authorities in our government so that there were some rationale of utilization of the resources. Incidentally the trunk road was put in at Kananaskis Road as it is known by a joint federal-provincial project after the last war, some 10 million dollars, as a conservation road to protect our water-shed and our water resources and to make the area more accessible for fire-fighting purposes. Of course that has brought a great many people in, the development of the oil industry has been tremendous. You might be surprised to know that you get up to the top of any of the mountains, six, seven, eight, thousand feet high, that in almost any direction you look you can see seismic trails. And you may not know unless you are an interested hunter, and Mr. Michalsky can testify(this is his home base)to the fact that you can go anywhere, there is just no place with a four-wheel drive you can go on the roads when the weather is dry. And I have been to the headwaters of nearly every major creek running into the Oldman River from Coleman north right back to the main range, and while I think about it I would like to make a brief observation if you don't mind about the lumbering industry. At the headwaters of Racehorse Creek, the north branch, there are hundreds and hundreds and hundreds of acres logged off and you never such an indiscriminate, such a dreadful-looking poor mountain area as a logged-off area the way they do it today. It's all orientated to our movement of these logs with tractor trucks or cats and the bull-dozed trails zig-zag up the side of a steep mountain so that they can get up there easily and slide them down. They pile up dirt and debris 15, 20 feet high which mother nature will not take back to its bosom in a

hundred years and they create, in my opinion, the finest place for erosion to take place that you can possibly imagine. This is also now taking place at the headwaters of Dutch Creek, beautiful Dutch Creek. I am sure Mr. Michalsky has hunted, guided, up in that area. This is one of the most famous big sheep areas behind Gold Dome and Tornado Mountain and here is a trail going way back in there that you could haul a 60-ft. trailer on. That's how good the roads are constructed, to hold these large trucks. And this summer Dutch Creek ran dirty. Ladies and Gentlemen, these are the waters that are feeding the Oldman River, the dirty Oldman and the poor Oldman River. We lived just south of it east of Lethbridge here and many times I forded this river in the Fall and hardly got my knees wet and it makes you wonder, about the supply of water 25, 50 years just in my children, not my grandchildren's, time. It makes you wonder about the industrial development, the limitation of industrial development, the limitation on an irrigation project, the limitation on the very lifeblood of all of us and this is my great concern, principal concern. I could go on for hours telling you about the wonderful things I've seen in the mountains, the beauty and the animals, the sheep he showed you, rubbing off that quarry, you saw that loose fur, I've observed them rubbing it off on the high balsam furs at 6, 8, thousand feet. I've observed every type of animal you could imagine up there and I get pretty worked up when I see what is happening where indiscriminate utilization is taking place. And irrespective of what coal companies say, they have made no effort, until a certain public pressure was brought upon them in recent years, to do anything about re-clamation. And for your information, there are no re-clamation laws in this province governing re-clamation in the green forest area. Now anybody tell me the contrary. There are as far as the roads are concerned, that they construct to get access to their

either development areas or those areas where they are prospecting for new coal. The worse thing is not what has taken place, it is what is planned. I don't think you have any idea how much money is being spent, there are five, or six, or seven companies, I can't tell you for sure but at least six, who are spending millions of dollars finding, looking, for what they consider economical coal supplies or coal supplies that could be developed economically. They are up the northwest branch of the Oldman, they made a road nine miles, again I say, a beautiful highway up to the top of Isolation Mountain between, there are about four different mountains, from the Kananaskis Road going west clear to the main range in the general direction of north. And all these mountains are prospective large coal-bearing areas. One company spent over one million dollars in one summer up there so it is reported. We are told now, I can't testify to this as a fact, but the amount of activity, the numbers of engineers, the numbers of employees, the amount of equipment including helicopters and almost every type of mechanical power-driven device you can think of, they are just going to no end and we are told that they are doing cost studies on transportation by railroad versus pipeline so the development has only started. And if we allow this thing to go on I call it rape, just outright rape and I implore and I beg this Board to use and bring in some rational program. I have nothing against corporate production, I think this is fine but I think it has got to be done within a reasonable utilization of the resources in consideration of the future. I don't see any point in leaving things there indefinitely but when they are doing more damage than good and I would like to support Mr. Hammond because this is the thought I wish to bring to you also. That the tourist and recreational values so far outweigh the value of coal development that there is just no comparison. This summer we were a little startled because it got

smokey for two or three days, we began to get a little apprehensive so we decided maybe we should get a little closer to civilization and decided we should go down to Waterton, pull our trailers down to Waterton. We went down to prospect the situation there. No way. You couldn't get into Waterton. Why, just a continuous of campers and trailers, and tent trailers, and tourists going and coming out of the park. No accommodation, nobody had gotten in since early morning and they were lined up, three or four of them, they can't even set up, they can't stop any place in the park, they have to get out. There is not sufficient accommodation at our recreational centres. And here we've got all these beautiful facilities up there and all this was the best experience we ever had. We went back to our happy little home up on Daisy Creek and though, "Oh my God, what a relief to be away from society." It was beautiful even though it was a little smokey. So I say to you, that when this road is properly developed and when the public finally realizes that here is a haven of beauty; this area of beauty I am talking about, up the Oldman, up Dutch, up any of these streams. I've been to the headwaters of them all, right to the mountains, the high alpine lake, the northwest branch. Unless it's Mr. Michalsky I'll bet there hasn't been anybody else up there, in this room. This is a heritage we can never have again and here it is in our laps and we want to desecrate it. Well, I'll tell you, Mr. Chairman, there was a philosophy among the ancient Romans that rape was inevitable, you might as well and relax and enjoy it. I'm here to tell you I'm not going to relax and enjoy it, I'm going to do my little part hopefully that you will initiate or able to initiate a reasonable, a comprehensive utilization plan for these resources that we have in that area. Thank you.

ROCKY MOUNTAIN RAMBLERS ASSOCIATIONPRESENTED BY MR. H.G. PECK

COPY OF MR. PECK'S LETTER:

29th December, 1971

Dear Mr. Flook,

Enclosed please find my brief, presented at Lethbridge (#12); it is not exactly as I spoke, but time was getting late, so I spoke "off the cuff".

I have tried to present facts and not opinions. My overriding interest is to pass on our heritage in as good a shape as possible to our children, while benefitting ourselves.

Yours truly,

(H. G. Peck)

BRIEF SUBMITTED TO THE ENVIRONMENT CONSERVATION
AUTHORITY BY H.G. PECK

Mr. Chairman, Ladies and Gentlemen:

My qualifications for speaking to you are twenty years of climbing, hiking, camping and snowshoeing in the mountains and foothills, as a leader in both Scouts and the Rocky Mountain Ramblers Association.

Mr. Jamieson has spoken to you at length on his company's Tent Mountain strip mine, twelve miles south of the Crow's Nest Pass, on the Continental Divide. He spoke as an engineer; I approached the same operation as an ecologist. I received great courtesy from all the company employees I met.

The Tent Mountain operation is in two parts; the lower and active part was of little value from an ecological stand point. But the upper portion, right on the Divide, is very valuable ecologically, as it has not been worked for at least ten years, and so gives us a preview of what uncontrolled strip mining will look like in ten or more years, after abandonment.

Taking the various forms of disturbance at Tent Mountain:-

1. VEGETATION. This shows very little sign of return; it should be borne in mind that the original vegetation must have been very sparse in such inhospitable surroundings. There is no sign of recovery whatever on the spoil tipple on the B.C. side of the Divide, and this will remain a horrible eyesore for generations, though I could not see it from the road south from Michel to Corbin; though the road was plainly visible from the tipple.

2. WILDLIFE. Has definitely returned; this was proven both visually and by tracks; in any case, there could not have been a large original population, due to the sparse browse. Bird life is also present.

3. WATER POLLUTION. There is no problem here. Deer had been drinking freely in the pools in the cuts, as shown by tracks, though there was ample water in the valleys that was untouched by the mines. I would not have

hesitated for a moment to drink from the pools myself if I had needed to, Any stream contamination physical or chemical, must have ceased after the mining ended.

4. EROSION. Surprisingly little. This really puzzled me, though I was naturally very pleased.

5. SLIDES. This is undoubtedly the most serious of any results of strip mining, and may not be apparent for years after mining has ceased.

There were a number of large cracks in the slopes above one of the cuttings; these clearly indicated an unstable condition; this area was comparatively small but it clearly shows what indiscriminate soil moving can do on steep slopes with comparatively scarce vegetation to hold the soil. And shows, too, that these results may not occur for years after mining has ceased.

Mining and oil companies have simply run amuk with roads and seismic trails in the public domain. To get a shallow drilling rig where they want it, they will callously endanger hundreds of acres of sloping land. Anyone who has seen the tremendous slide in East Verdant Valley (west of Banff, on the B.C. side of Red Earth Pass) which is far more impressive than Frank Slide, will realize that the coal and oil companies have been quite irresponsible in their earth moving and that they must be compelled to respect our property, since they will not do so of their own accord.

The Remedy? No roads or grades, permanent or temporary, or any open workings, should be permitted to be made either up or across any slope having a grade within ten degrees of the angle of repose.

(H. G. Peck).

ALBERTA FISH AND GAME ASSOCIATION

ZONE 1

PRESENTED BY: MR. TERRY PSALTIS AND
READ BY MRS. FRANCES SCHULTZ

Lethbridge, Alberta,
December 15, 1971

The Zone 1 Council of the Southern Alberta Fish and Game Assoc.
submits this brief to the Alberta Environmental Conservation Authority.

Our organization is very concerned that extensive environmental damage will accompany any strip mining operations in mountain regions. It has also been our feeling that existing regulations and enforcement policies are inadequate to guard against irreclaimable damage, should extensive strip mining be contemplated. It is our belief that before strip mining is allowed to proceed, a comprehensive overall operation and approved, and that in areas where restoration is not possible with current technology strip mining should not be permitted.

Here are a few recommendations that we respectfully request should be given careful study and consideration.

1. Restoration should be made available to the Dept. of Lands and Forests for study and approval prior to the onset of stripping operations or the establishment of new exploration areas.
2. Immediate restoration of areas disturbed during exploration activities to date should be carried out. While complete restoration on those disturbed areas to be strip mined within one year may not be feasible, steps should be taken to prevent soil erosion within these areas.
3. Since there is a profound need for more comprehensive and detailed legislation governing strip mining and reclamation of strip mining areas within the province, it is recommended that the Government of Alberta develop such legislation at the earliest possible date. There is a particular need for specifications pertaining to strip mining in mountainous areas.
4. It is recommended that immediate steps be taken to require retention of overburden and top soil at all excavations separate from exposed coal to ensure adequate restoration following backfilling and reseeding.

Our organization would like to go on record as not opposed in principle to coal mining or even strip mining. We are however strongly opposed in principle development of any area on a single purpose basis without assurance that environmental disturbances will be kept to a minimum. Our investigations to date do not give us those assurances. When our concern was first voiced we were mainly concerned about the Grande Cache area. We were assured that strip mining in this area would be minimal. Recent observations led us to believe otherwise. We have found that several Coal Mining Regulations have been violated.

1. The Coal Mining Regulation Act (Section 113.) After three years of exploration no visible restoration work has been attempted other than to fill some pits where no coal was found.
2. The Forest Act (Section 60.) The method of road construction is not only wasting timber resources but is also creating a serious fire hazard.
3. The Public Lands Act, 1966 (Section 49.) The land surface has been destroyed and no effort has been made to separate and stock-pile surface materials to enable later reseeding and restoration.

Without restoration the watershed capacity of the entire area can be affected and if the basin areas are used for dumping of overburden, every stream, river and watercourse in the area will be destroyed. It is noted that no yet know seedable vegetation exists to replace vegetation being destroyed above the 6000 foot level. The Grande Cache is but one of many. We are greatly concerned about the Eastern slopes of the Rockies and our forest reserves, this could also spread into the Parks, e.g. Cypress Hills.

The current mistake is the assumption that there is an unending supply of wilderness and there is no need to worry about it now. The fact is that the supply of wilderness is nearly exhausted and without serious protective measures will soon be a thing of the past.

This reference is made to elaborate on the need for Legislation to guarantee the protection and preservation of our wilderness and natural resources.

Yours truly,

Terry Psaltis,
Tourist Liaison.

MAYOR ANDERSON: CITY OF LETHBRIDGE

Chairman Walter Trost and other Members of the Environment Conservation Authority who are with us today, Dr. Smith, Mr. Paul Babey, Mr. Flook, along with the supportive staff, I would like to express our appreciation to you for selecting Southern Alberta to make the presentation of briefs, and particularly the City of Lethbridge at this time. As you know, Dr. Trost and those associated with him, have been responsible for organizing a Public Advisory Committee with very broad representation. I think the input into this type of organization is very important. Also the Scientific Advisory Committee which you have established, you have selected some of the most responsible and capable people we have in the province, so we look to some excellent results and legislation which we can all live with. And it is only through this kind of input and a change in our communication that we are going to do this and we do hope that within a very short time this legislation will be forthcoming, when the presentation is made to the government. There is some urgency about the situation because we recognize, as a top priority, developing legislation to protect environment which is being destroyed at such a rapid rate. We in Lethbridge of course as other communities, are concerned about pollution which is another area which we put a great deal of emphasis on, and we have had a good number of citizens within our community who expressed real concern about areas of pollution. I think, effectively, we have remedied a number of areas that the citizens of Lethbridge and Southern Alberta are concerned about. Firstly in water pollution. Another area which I think we have to pay a great deal of attention to is land pollution. And that is one area that I hope some work will be done on very shortly. Our administration is presently doing work on this particular area, of the land pollution. I refer to some of these car lots with thousands of cars involved. I think it is very destructive to the esthetic value in any community and we are hopeful that in time will be eliminated. I would like to say that we are very pleased indeed to have you people with us on this occasion on this very important subject and we hope that we will have the very pleasant privilege of again meeting with you on other occasions. Thank you, Gentlemen.

THE IMPACT ON THE ENVIRONMENT OF SURFACE MINING IN ALBERTA

**PUBLIC HEARINGS
AT
EDMONTON**

**NORTHERN ALBERTA JUBILEE
AUDITORIUM
DECEMBER 17, 1971**

**ENVIRONMENT CONSERVATION
AUTHORITY**



3.1

BRIEF ON

THE ENVIRONMENTAL IMPACT OF SURFACE MINING IN ALBERTA

submitted to the
Environment Conservation Authority
Friday, December 17, 1971

Prepared by
Geology Division, Research Council of Alberta

Compiled by
G. B. Mellon

INTRODUCTION

Coal deposits of late Jurassic to early Tertiary ages underlie much of the Alberta Plains and Foothills at depths ranging from 0 (i.e. at the surface) to 10,000 feet. Although much of this coal is buried too deeply to be considered as an exploitable mineral resource in the foreseeable future, an estimated 25 to 50 billion tons can be recovered by conventional underground and surface mining techniques. This constitutes a major source of potential mineral wealth for the Province of Alberta, and it is assumed in presenting this brief that these coal deposits will be extracted and utilized in accordance with the material requirements of the people of the province and with due regard to protection of the environment.

DISTRIBUTION OF COAL

Potential coal-bearing strata in Alberta vary widely in their geologic, physiographic, and climatic settings. The geologic aspects are summarized briefly in table I in which the major coal deposits are classified by the rock units or formations containing them.

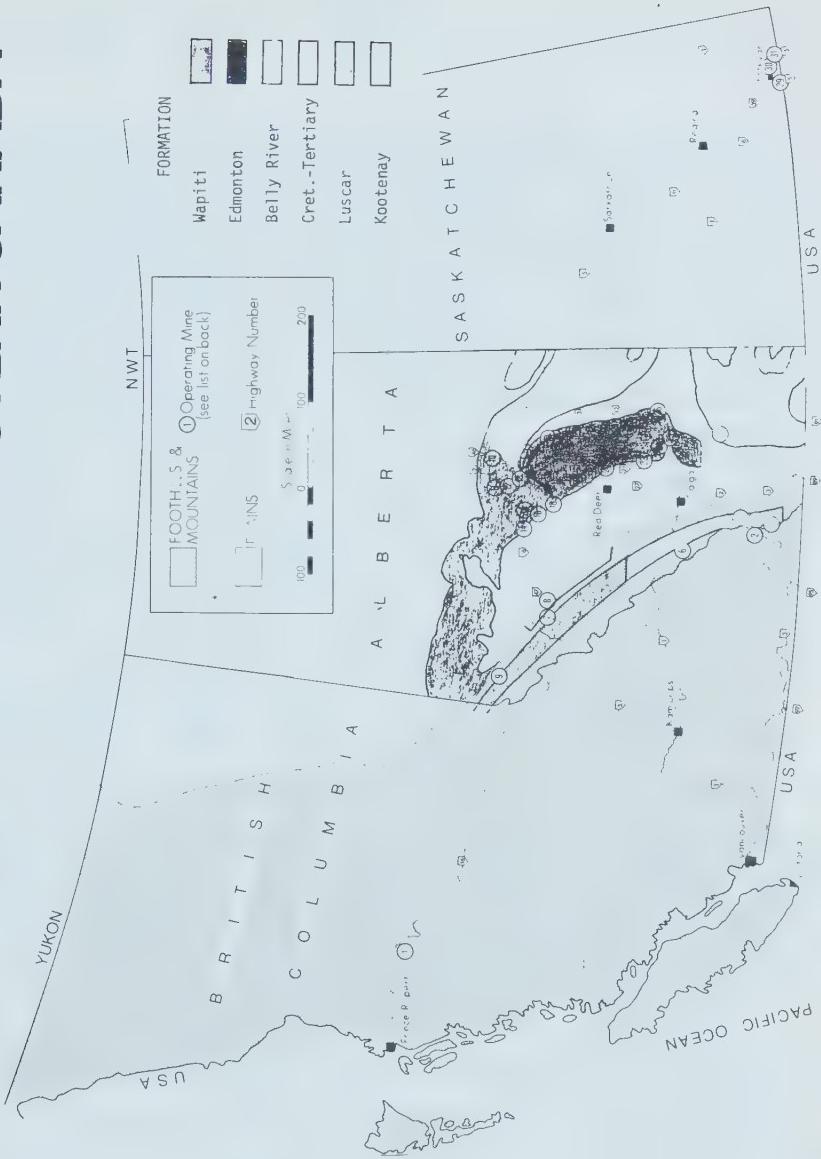
Plains

Although most of the concern about the effects of coal mining on the environment is focused on the Foothills, a much larger area of the Alberta Plains is underlain by potential coal-bearing formations. These formations (Edmonton, Belly River, and Wapiti Formations) outcrop as an arcuate belt

Formation	Age	Extent	Structure	Coal Quality
Wapiti	Upper Cretaceous	Northwest-central Plains	Simple (flat-lying)	Subbituminous to high volatile bituminous
Edmonton	Upper Cretaceous	Central Plains	Simple (flat-lying)	Subbituminous
Belly River (Various Names)	Upper Cretaceous	Southeast and east-central Plains	Simple (flat-lying)	Lignite to Subbituminous
Luscar	Upper Cret.-Tertiary	"Outer" Foothills - N. Sask. to Athabasca Rivers	Moderate to complex	High volatile Bituminous
Kootenay	Lower Cretaceous	"Inner" Foothills - Red Deer River north	Generally complex	Med. to low volatile bituminous
	Jurassic	"Inner" Foothills - Red Deer River south	Generally complex	Med. to low volatile bituminous.

TABLE I. COAL-BEARING FORMATIONS OF THE ALBERTA PLAINS AND FOOTHILLS.

COAL MINES OF WESTERN CANADA



of strata from 30 to 140 miles wide which extends from the International Boundary in southeastern Alberta, northward through east-central Alberta, then west across the north flank of the Swan Hills to the British Columbia border. The beds are nearly flat-lying to very gently dipping, and in most places are covered with a veneer of unconsolidated glacial deposits from a few to several hundred feet thick. They extend across a variety of climatic and vegetative zones, ranging from dry open prairie in the southeast through the parkland of central Alberta, to the boreal forest in the northwest. The topography, although generally subdued, is relatively rugged in some areas -- for example, about the flanks of the Swan Hills and near the confluence of the Kakwa and Smoky Rivers in the northwest.

The potential coal-bearing nature of these rocks is stressed, for it is obvious that in much of the region underlain by these formations that coal seams will be either absent or too thin or deeply buried to constitute an economic deposit. On the basis of present knowledge, that portion of the province between township 77 (inclusive) and the International Boundary, excluding the Rocky Mountains and Foothills on the west, can be categorized in terms of its mineable coal potential as follows:

	<u>Coal potential</u>	<u>Square miles</u>	<u>Percentage</u>
(1)	Moderate to high potential - (Edmonton, Belly River, and Wapiti Formations)	13,250	10.4
(2)	Low potential (Edmonton, Belly River and Wapiti Formations)	48,000	38.1
(3)	Non-coal-bearings bedrock - (Paskapoo, Willow Creek, and Bearpaw Formations)	65,050	51.8
	Total area considered	126,300	100.0

Much of the high potential coal area is found in the upper part of the Edmonton Formation along the western edge of the outcrop belt: the so-called Ardley Coal Zone which extends from east of Calgary northward to the Wabamun-Whitecourt area, about the flanks of the Swan Hills westward to the Simonette River. Other substantial deposits are found in the lower part of the Edmonton Formation in central Alberta, in the Wapiti Formation south of Grande Prairie, and in the Belly River Formation of southeastern Alberta. However, in assessing these areal estimates of potential coal-bearing strata, the interested observer should keep in mind that the figure of 13,250 square miles is an absolute upper limit on the moderate to high potential area; in all likelihood that portion of the Plains that may be subject to surface mining in the foreseeable future is probably closer to 1,000 square miles (approximately 0.4 per cent of Alberta's area.)

Foothills

The Alberta Foothills is a narrow belt of folded and faulted sedimentary strata extending along the eastern margin of the Rocky Mountains from the International Boundary in the south to the British Columbia border in the north, a distance of approximately 450 miles. This belt is approximately 20 miles wide on the average and thus encompasses in the order of 8,000 to 10,000 square miles of relatively rugged terrain.

Potential coal-bearing strata are exposed throughout almost the entire Foothills region, from Pincher Creek in the south to Kakwa River in the north. They outcrop as a series of narrow, en echelon belts of strata trending in a

north to northwesterly direction, parallel to the regional strike of the Foothills. The strata tend to be complexly folded and faulted, and steep dips predominate in contrast to the flat-lying coal beds of the Plains. Consequently, exploring for and developing coal resources of the Foothills present some complex geological and engineering problems, requiring as a rule closely spaced drilling programs and possibly geophysical surveys to determine precisely the distribution and amount of coal in place.

Most of the Foothills coal is confined to the "inner" or western part of the Foothills, extending in some areas into the Front Ranges of the Rocky Mountains. The coal is medium to low volatile bituminous in rank and is the source of metallurgical or coking coal now being mined in the Crowsnest Pass and at Canmore, Luscar, and Grande Cache. South of the Red Deer River, the deposits are confined to the Kootenay Formation; north of the Red Deer River they are found in the Luscar Formation which extends as a coal-bearing unit into northeastern British Columbia.

In addition to the coking coal deposits of the "inner" Foothills, coal of high volatile bituminous (non-coking) rank is found in strata of Late Cretaceous-Paleocene age along the eastern or "outer" margin of the Foothills. These deposits crop out in a narrow zone which extends approximately from the North Saskatchewan to the Athabasca Rivers and possibly northward towards the Smoky River. Although the geologic structure in this region tends to be less complex than in the "inner" foothills to the west, bedrock in the eastern Foothills tends to be covered with glacial deposits, and good

exposures of coal-bearing strata are scarce. This makes prospecting difficult, especially in areas of complex structure.

The total areas of the Foothills that ultimately may be subjected to surface mining for coal deposits is difficult to predict; prospecting for coal is quite active, but the results of exploration programs are generally not available owing to the highly competitive nature of the industry. Nevertheless, Peterson and Etter¹ have estimated that at least 32,000 acres (50 square miles) could be strip-mined for coal in the Foothills over the next 20 years, which probably is the correct order of magnitude. Although this area is small compared to the total area of the Foothills and Rocky Mountains, the estimate does not take into account the potential area that could be altered by access roads, plant sites, townsites and other service facilities. Thus if surface coal mining ultimately extends throughout the entire length of the Foothills, the associated activities will have much more significant impact on the development of this region than the actual strip-mining operation themselves.

Summary

In summary, near-surface coal deposits have a wide distribution throughout the Alberta Plains and Foothills. They exhibit great diversity in:

- (1) quality and rank, and hence potential markets and economic value to the province;

¹ Canada Dept. of the Environment; Forest Research Laboratory Information Report A-X-34, 1970.

(2) geologic setting:

- distribution (outcrop pattern);
- structure (dip, strike, and folding of beds);
- bedrock stability;
- thickness and type of overburden;

(3) surface and groundwater conditions;

(4) elevation and topography;

(5) climatic, vegetative, and faunal zones.

Because of this diversity, we suggest that no all encompassing detailed regulations should be set up which purport to deal with all phases of surface reclamation of land disturbed by strip-mining operation. Rather we suggest that the Government enact a set of broad principles or guidelines for the restoration of disturbed land that permits a reasonable degree of flexibility in planning and implementing reclamation procedures for specific operations.¹ This approach seems particularly relevant in view of the lack of knowledge which exists with respect to preferred reclamation procedures in many cases.

¹ For example, the authors of this brief have been told that one of the coal mine operators in the province has been required to replace the topsoil in the area to be reclaimed subsequent to mining activities. No topsoil exists at the proposed minesite; only rock rubble is available for reclamation.

RECLAMATION: DEFINITION AND OBJECTIVES

Reclamation of disturbed land implies:

- (1) that the land be returned to its original natural state as closely as possible; or
- (2) that the land be reclaimed for some alternative use -- recreation, game management, agriculture.

The authors of this brief feel that too much stress has been placed on the first item (that the land be returned to its natural state), especially in connection with reclamation in the Foothills. This approach appears relatively simple at first glance, requiring:

- (1) that the abandoned mine be filled with rock rubble;
- (2) that the "topsoil -- carefully scraped aside and preserved during the mining operation -- be replaced on top of the rock rubble;
- (3) that the mine site be reseeded to grasses, shrubs, or trees.

Although this procedure will never completely restore the mined area to its original state, the net results presumably will satisfy most people.

The authors agree that this procedure may well be the preferred approach to reclamation in some areas of the Foothills but point out that alternative land uses should be given serious consideration in other areas. As earth scientists, we do not have an aversion to bare rock walls (as opposed to spoil heaps) that may expose strata and geologic structures of interest to professional and amateur geologists alike.¹

¹ Appended at the end of the brief is a description of a unique rock cut made during highway construction near Birmingham, Alabama (from "Geotimes," October, 1970). The rock cut has since been designated a geological monument to preserve rock strata and structures that otherwise would not be observed in the natural exposures of the area.

Some of these may be worth preserving, for the features which they display may not be duplicated by natural rock exposures in the area, or, if present, may not be easily accessible.

Similarly, lakes and ponds are relatively uncommon in the Foothills and parts of the Plains. Thus, it is possible that mine excavations in certain situations could be impounded to hold water and possibly stocked with fish to provide a recreational area where none existed before. The main requirements in such situations are to ensure that the surrounding area is cleaned up (litter removed, spoil heaps stabilized and revegetated) for aesthetic reasons and that safety hazards are removed.

In summary, we do not regard surface coal mining in portions of the Foothills as an unmitigated environmental disaster. Mining activities will provide access to regions that normally would be inaccessible to the great majority of citizens, and may well create situations for recreational land use that otherwise would not exist.

ADMINISTRATION AND IMPLEMENTATION OF RECLAMATION PROCEDURES

We recommend:

- (1) that a survey of the proposed mine site, access routes (roads, railroads), plants and townsites be carried out in advance of mining and development operations.
- (2) that the survey consider the following aspects:
 - distribution and properties of bedrock and surficial materials;
 - surface and groundwater regimes;
 - fauna and flora
- (3) that the survey be carried out by an independent investigating body composed of experts in relevant fields and responsible directly to

the Environment Conservation Authority. In this connection we are concerned that inadequate emphasis in the past has been given to the geologic, hydrologic, and engineering aspects of reclamation.

On the basis of the survey results and the proposed mine operation, recommendations can be drawn up with respect to preventing or minimizing environmental damage during all phases of the operation, including exploration, extraction, and reclamation. These recommendations should be forwarded to the Authority for discussion and approval, who then will forward them to the mine operator. Differences of opinion concerning the proposed reclamation procedures and other environmental precautions presumably would have to be reconciled within guidelines set up by the Department of the Environment.

We note that the procedures outlined above are at variance with the concept expressed in the Department of the Environment's position statement of November 26, 1971 (item 2.3) that the "proposed legislation would place the responsibility on the resource user to identify the nature and extent of damages....."

COLLECTION AND DISSEMINATION OF INFORMATION
ON RECLAMATION PROJECTS

What is the status of coal mine reclamation projects in Alberta to date?

For example, what has happened or is happening to:

- (1) old surface mine excavations and spoil heaps in the Crowsnest Pass and the Coal Branch? Is there any evidence of water pollution, revegetation, or erosion in these areas?

- (2) present reclamation projects at Wabamun, Forestburg, Canmore, and Luscar? What are the problems, successes, and failures?

Data on both disturbed and reclaimed terrain should be documented fully and made available in a central data file to those involved in investigating, planning, and implementing future reclamation projects. Reclamation is expensive, and failed efforts should not be duplicated.

COMMENTS ON SPECIFIC ASPECTS OF ENVIRONMENTAL CONTROL

Removal and Replacement of Overburden and Topsoil

The thickness and composition of overburden vary widely from one coal deposit to the next. In general "overburden" consists of:

- (1) bedrock - mainly sandstone and shale, which varies widely in composition, engineering and weathering properties from one locality to another;
- (2) unconsolidated surficial deposits - mainly of glacial origin, such as till, outwash sand and gravel, lake clay, etc.

"Topsoil" conventionally refers to the upper few feet or inches of weathered material developed on the surface of bedrock or, more commonly in Alberta, on glacial deposits. Although reasonably thick over most of the Plains, soil profiles and glacial deposits tend to be much more erratically distributed in the Foothills, becoming as a general rule thinner or absent altogether at higher elevations. Thus, in many parts of the Foothills where coal-bearing formations are present, the "soil" cover consists of a few inches or feet of rock rubble mixed with small

amounts of sand and clay (colluvium). Where possible this material should be preserved and replaced after mining to provide some sort of soil-like rubble for revegetation of the area.

One of the most important duties of those involved in planning and recommending reclamation procedures will be to assess the distribution, thickness, and composition of the surficial deposits at and adjacent to proposed exploration trails, mine sites, and access roads.

Design of Spoil Banks and Erosion Control

We commend to the Environment Conservation Authority and to other interested parties a report on "Stability of Waste Embankments" compiled by a subcommittee of the Canadian Advisory Committee on Rock Mechanics (dated September 2, 1969).¹ The report states:

"In view of the recent major failures of waste embankments, the recent increase in Canada of major mining development, the lack of mining regulations in Canada and the limited background of mining engineers in stability engineering the sub-committee believes that a potential serious problem does exist and that urgent action is required to control the problem."

The report includes the following salient recommendations:

- (1) develop a design guide for the investigation, design and construction of waste embankments;
- (2) project (research) proposals on the stability of waste embankments should be given favorable consideration;
- (3) encourage existing mining research programs in Canada to expand to include practical research relating to site.

¹

A summary of the report's findings and recommendations is appended to the brief.

investigations, design, construction, maintenance and inspection of waste embankments.

Prospecting Procedures

Trenching and drilling, supplemented by outcrop mapping and geophysical surveys, are conventional techniques for coal exploration and assessment of reserves. The relative merits of these techniques and the spacing or intensity of exploration surveys vary from one coal deposit to another, depending primarily on geologic conditions (overburden thickness, structure, lithology) and on accessibility. Thus, we must accept the fact that in areas of complex structure and thick overburden -- a situation that applies to many parts of the Foothills -- there can be no hard and fast regulations to govern the spacing and intensity of exploration activities. If a company has been granted a lease by the Government, it must be allowed to assess its economic potential within standards generally accepted by geologists and mining engineers. This philosophy does not absolve the coal companies from their responsibility in reclaiming or compensating for land disturbed by exploration activities, an area in which some detailed investigations are required.

However, if the Government decides, for aesthetic or other reasons, that conventional exploration activities are undesirable in certain areas, these areas should be withdrawn from leasing and the companies involved compensated for their expenditures.

Construction and Location of Roads, Trails, and Campsites

Planning and construction of roads, trails, and campsites should be subject to the same general guidelines governing the planning and implementation of actual mining activities. Again, we stress the necessity for proper geological and soil surveys during the planning stages of these activities, to avoid some of the problems encountered, for example, in construction and maintenance of the road built south from Highways 16 to the Luscar minesite.

Hydrologic Problems.

(1) Protection of streams, creeks and rivers

Problems caused by exploration or mining activities in the vicinity of creeks and rivers can be best prevented by excluding lands within a certain distance of major creeks and rivers from leasing. At present this procedure is not followed; lease boundaries contain stream valleys and beds as well as the interfluvial areas. Undoubtedly, some disputes will arise concerning the definition of a major stream, which points out the need to define and interdict these areas prior to exploration.

(2) Groundwater disruption and pollution

In the prospectus prepared by the Environment Conservation Authority dated November 12, 1971, the following statement is made:

"It has been suggested that they [environmental effects of coal mining in Alberta] may already have caused serious disruptions to the subsurface hydrology of certain areas and that this in turn could endanger the water supply to the Prairies."

We ask what is meant by this statement, which in its present form is

liable to mislead and unduly alarm the general public. If it is taken to mean "adverse effect on the groundwater regime" implying a deterioration in quality and quantity of available groundwater, there is no tangible evidence to support the statement.

Groundwater regimes to depths much in excess of the depths of surface mine excavations are associated with and contained within local drainage basins, i.e. within the valley of a single stream. Systems of groundwater flow originate and terminate within the boundaries of these basins, and generally any contaminant entering the local groundwater system will surface again (if at all) in the same valley. Any interception of the flow will cause a decrease in underground flow rates in the same watershed only. There is no basis to the suggestion that neighboring groundwater systems, let alone those in distant prairie areas, will be significantly affected by localized mining operation in the Foothills.

With respect to contamination of surface water supplies through discharge of noxious effluents by local groundwater systems, it is pointed out that chemicals are not used in surface mining operations and that the sulphur content of Foothills coal is generally low (less than 0.3 per cent pyritic sulphur). Thus, problems associated with acidic or other undesirable mine effluents -- serious in some coal mining regions of the world -- are unlikely to be met in Western Canada in any case.

INVESTIGATION REQUIREMENTS

In view of the uncertainty that exists with respect to the effects of coal surface mining in Alberta and to the procedures for reclamation of

disturbed land, we suggest that some need exists for study into those matters bearing on:

- (1) costs and benefits of coal surface mining to the Province and to the community as a whole;
- (2) effect on alternate land uses;
- (3) various technical aspects of surface mining and reclamation, such as:
 - erosion potential and control;
 - surface and groundwater pollution;
 - waste embankment design and construction;
 - potential safety hazards;
 - revegetation and other reclamation techniques.

Although some knowledge on these matters can be obtained from the results of land reclamation projects performed elsewhere, the economic, geologic and ecologic conditions associated with coal mining in Western Canada are quite different from those associated with coal mining in Europe or the eastern United States. Even within Alberta, the diversity of settings in which coal-bearing strata are found indicates that reclamation procedures that have proved successful in one area of the province will not necessarily be successful elsewhere. Therefore, we recommend that the Government set up a task force to survey the need for research into problems associated with surface coal mining in Alberta and to undertake a systematic study of those problems for which solutions currently are uncertain at best.

List of Contributors

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QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

Is your suggestion for regulation that it not be strict or closely defined because the terrain and location problems are so diverse?

DR. G.B. MELLON

That is correct. We feel that the problems of operating and reclaiming mine areas in the prairies of Southeastern Alberta are substantially different from those surface mine areas near tree-line elevations in the foothills. The geologic structures are entirely different. The distribution of surficial deposits including topsoil, is quite different. The authors of this brief have been told that a coal mine operator has been required to replace topsoil in the area to be reclaimed, subsequent to mining activities. There is no topsoil at the proposed mine site. Only rock rubble is available for reclamation. This is the sort of thing we call to your attention. In drawing up detailed regulations I think there should be some flexibility.

DR. WALTER TROST

If a person were to make a terrain-dependent regulation, for example have regulations that related only to strip mining in the prairies, so you think reasonable regulations could be worked out?

DR. G.B. MELLON

I believe we could work out a set of guidelines that would be generally applicable to the prairies. There is substantial diversity in the plains region. However a terrain-dependent approach to the problem of setting guidelines would certainly be advisable.

DR. WALTER TROST

Then, your emphasis, in fact, falls on pre-planning and site selection?

DR. G.B. MELLON

Yes. I think that we must plan in advance what we are going to do with this land,

how we are going to mine it, what the pollution problems are, how we prevent them and how we best reclaim the land afterwards. It is too late in some cases to start thinking about these things when the mine is in operation. This is why we suggest an independent review body responsible to the Authority which would assess the recommendations and the mine operation well in advance of the activities.

DR. WALTER TROST

I was also interested in your comments on the watershed problems. When we were in Lethbridge we had a very strong submission from the City of Lethbridge in which it made representations to us on the danger facing its river and watershed area from stripping practices in the mountains to date. It seemed to me that you said there hadn't been noticeable deleterious effects in this respect so far.

DR. G.B. MELLON

I will try to distinguish between problems associated with surface water, streams creeks and rivers. These are, I think, erosional problems and I think they do exist locally in coal mining areas. It is interesting to me and my colleagues that whenever comments are made on ground water and surface hydrology, they are usually prefaced by statements like, "we believe", or "we feel". It is our impression that much of the alarm that has been raised about sub-surface, not surface, hydrology with respect to coal mining is not documented by scientific evidence. We have a large groundwater group in the Research Council of Alberta which has done a great deal of theoretical and practical work on groundwater flow systems. They feel that there is really no basis for suggesting that the groundwater supply of the prairies is going to be significantly affected by coal mining operations. This problem of subsurface hydrology is very complex and it would take a great deal of time to really go into it in detail. I think I would stand by my statement that if it is taken to mean adverse affect on the groundwater regime; implying a deterioration in quality and quantity of available groundwater on a regional basis, there is no tangible evidence to support this statement.

DR. WALTER TROST

There were discussions of other ways of getting energy from coal rather than lifting it to the surface and burning it there. What is the prospect now for getting energy from coal without mining it?

DR. G.B. MELLON

I am not really knowledgeable in this field. I believe some experiments have been carried out on burning coal in situ. I am sure that some information exists in the literature on the theoretical, and perhaps the actual experimental data on this subject, but I am not familiar with it.

DR. STUART SMITH

I think you clearly indicated that land use, or alternate land uses, might be considered. Reclamation obviously implies that land will be used. Would you agree that land should be returned to where its economic value is as great or greater than before the mining took place?

DR. G.B. MELLON

I suppose this is the ideal for which we should strive. The problem is putting a value on the esthetic aspects of the land particularly in the foothills. I think that there are very obvious difficulties in approaching this problem.

DR. STUART SMITH

Exploration has been mentioned prominently in most briefs including yours. I wonder, from the point of geologists involved with mining properties, what new research might have been done into methods of exploration. Exploration technology now largely resides in one man riding a bulldozer. What is the possibility of using new methods for exploration?

DR. G.B. MELLON

I think some advances have been made. For example, the introduction of geophysical surveys into coal exploration is relatively new. These are the so-called induced potential surveys, but here again these are simply being used as a guide to subsequent drilling or trenching. In any mining deposit, be it coal, lead, zinc, iron, the final test of its economic grade will be the trench or the drill hole and I don't see how we can get away from that. I don't think any of the companies would accept evidence from a geophysical survey to base their future operations. The other advances concern types of drilling, different coring procedures, etc. But these really don't affect the problems that the Authority is faced with. You still have to set up a drill. You still have to get to the site. This is going to be with us as long as we accept the fact that the companies have been given the right, or the privilege if you wish, to assess the economic potential of their deposit.

DR. STUART SMITH

Is there any justification for accelerating the extraction rates in areas where problems are minimized to give us more time to look at the problems in the more difficult areas?

DR. G.B. MELLON

I think the easiest areas to explore are the plains regions, and perhaps the so-called outer foothills belt as opposed to the inner region which holds coking coal deposits. We have to look at the use to which this coal will be put. There is a wide range in quality and rank of coal across the province. The existing markets are largely for our bituminous coking coal in the foothills. Because of the great local variation in terrain there, I think it would be difficult to place restrictions on the companies which now hold leases in that area.

3.2

CALGARY POWER LTD.

PRESENTED BY T. D. STANLEY

The Company wishes to thank the Environment Conservation Authority for this opportunity to present its views on surface or strip mining in Alberta. The Company has operated the Whitewood Coal strip mine adjacent to the Wabamun Steam Electric Plant at Wabamun since 1962. It has been active in a reclamation program of the area mined and feels that it has attained a considerable amount of success in its efforts.

Appendix "A" to this brief presents the story of the Whitewood Mine, along with pictures to show the progress which has been made, and substantiates the Company's belief that it is possible to carry on a prairie strip mining operation with no permanent ill effect on the environment, and under conditions at the Whitewood Mine, even develop a higher grade use of the land. Appendix "B" presents a brief story on the Highvale Mine, located adjacent to the Sundance Steam Electric Plant on the south shore of Lake Wabamun.

The Company does not propose to discuss or describe in detail the process of strip mining of coal, but only to mention some principles based on nine years of operation which it believes are important in both winning the coal and reclaiming the surface at reasonable cost.

This brief will deal only with prairie strip mining, the only area in which the Company has experience, and not strip mine operations in the foothills or mountain areas.

Calgary Power Ltd. has not been engaged in the commercial development of coal, and has limited its coal mining developments to the supply of coal to its steam plants for the production of electric energy. The only exception is the sale of small quantities of domestic coal at Wabamun to meet the provisions of the Crown coal leases. It does not mine coal for re-sale and the economies which can be achieved by its use as an energy source are passed on directly to its power consumers.

At the present time the Company owns two coal mines, the Whitewood Mine and the Highvale Mine. The Whitewood Mine is producing up to 2.4 million tons a year, which is the maximum that will be required for the Wabamun Plant. Highvale Mine is now operating at the rate of 1.2 million tons per year, which will increase to about 6.1 million tons per year by 1978. In the long term it would appear that by 1980 the Company's demand for coal will be about nine million tons per year, and increasing to about 22 million tons by 1990 if coal continues to be the primary source of the Company's electric energy supply. The Company feels that a substantial portion of this requirement will come from prairie strip mines, either operated by the Company or others. The benefit to the province of low cost energy sources is substantial, and it is the Company's belief that prairie strips can be operated so that

environmental damage is minimal, in fact under some circumstances the end use of the land may even be enhanced.

Prairie strip mines provide the lowest cost energy which is presently available to the people of the Province, and it is certainly to their benefit that coal is used as a source of energy for electric power. The present cost of coal in the power plant from the Company's mines lies between 11 and 13¢ per million BTU's, which is less than the cost of gas now available. Although the capital costs of coal fired power plants are appreciably higher than gas fired plants, when the Provincial economy is considered it would seem better to use coal, a local fuel that cannot be readily exported, rather than gas, a premium fuel, which can be transported easily and which is a basic raw material for petrochemical and other industry.

The present reclamation being carried on by the Company at the Whitewood Mine has been under the direction of the Inspector of Mines and the Surface Reclamation Council, who operate under the Coal Mines Regulation Act, and the Surface Reclamation Act, respectively. As far as the Company's activities in its reclamation work at the Whitewood Mine, it has never had any doubt that this work was fully provided for in the legislation in both the above Acts. In other words, the Company feels that reclamation in the prairie strip is already adequately covered by Provincial legislation.

The Company accepts the responsibility as a coal operator to carry out the necessary reclamation. However, it feels that rigid rules on how this should be carried out could increase costs and may not improve the reclamation results. In other words, the Company believes that the coal mine operator should have a major voice in methods and procedures of the reclamation work, with the end result being the over-riding criteria.

The Company believes that each mine is unique with its own particular problems and advantages. Any reclamation act or regulation must be flexible enough to meet these different circumstances. Possibly the biggest difference between mines lies in the basic climatology of the area in which they are located. It is obviously much easier to produce vegetation in the parkland of Alberta, where the Company operates, than it would be for mines in more arid areas of the prairies.

Each mine lends itself to a particular mining layout and method of handling material. The Company believes that the most economic mining plan will be lower in over-all cost than doing extra work for reclamation at the time of mining. In other words, it is more economical to maintain a logical mining plan even if the ultimate cost of reclamation by itself is increased.

Because of the uniqueness of any one mine, it is felt that the reclamation plan should not be too rigid. Different and improved approaches to the reclamation problems become evident with experience and experimentation as the work progresses. The same applies to the final use of the land.

In many cases only after reclamation work is well advanced will the best ultimate use become evident. Therefore the end use should not be "tied down" too early in the development.

In most cases the cost of reclamation will likely be in excess of the original value of the land expressed in terms of purchase price. Our experience would indicate that some reasonable relationship between the cost of reclamation and ultimate use can be maintained.

The cost will vary from mine to mine and cannot be expressed in terms of the tons of coal mined, because reclamation costs are a factor of acreage, whereas the coal mined is a function of the thickness of the seams and varies greatly from mine to mine.

Mining conditions such as whether the operation is concentrated in one area or widespread, as well as the amount of overburden which has to be stripped in any one case, has a bearing on the progress of reclamation. This, of course, varies from mine to mine, and even within a mine.

It is obviously desirable to have the reclamation follow as closely behind the mining operation as possible, but the company experience would indicate that a time lag is inevitable, particularly when a new mine is opened up. Working space between the reclamation and the mining must be established, but once established it is possible to keep the reclamation in step with the mining. This is illustrated by the pictures of Whitewood Mine in the Appendix "A", which shows the first start of reclamation in the new mine in 1966, four years after the original mine began.

After mining has been completed the first basic step in the reclamation program involves contouring of the land and the establishment of a vegetative growth, usually a grass or legume crop. After this has been completed the question of ultimate use has to be considered. The question as to where reclamation ceases and development begins is hard to establish. It may also be necessary to delay the ultimate use of the land because of safety reasons and the protection of the public.

In the prospectus issued by the Environment Conservation Authority, dated November 10, 1971, the Authority ask for comments on several points. Again, our comments here only pertain to prairie strips.

Each mine is unique in itself and the question of removal, storage and replacement of top soil will vary from mine to mine and no over-all general rule should be set down. As an example, the replacement of the muskeg which is a topsoil condition over much of the Whitewood Mine would be undesirable and unpractical. It is remarkable the way the spoil piles at Whitewood are supporting vegetation. Top soil at the Highvale Mine is a very thin grey wooded type soil of poor quality and could not be reasonably stored or salvaged. On the other hand, there may be mines with a substantial thickness of top soil where this would be a practical method.

The time lapse between one turnover cut to the next is again a unique function of any mine in question and is regulated by the mining plan and methods of mining. Again, the design of the spoil banks is more a function of the mining procedure than the reclamation procedure and the contouring and reclamation treatment which is given to them is best decided during the process of reclamation. Revegetation on the contoured banks will be a matter of experiment using the advice of agriculturalists and other qualified specialists who are familiar with the area.

The prospecting for prairie coal strips is usually done by drilling on road allowances and hence causes very little disturbance to the environment.

There are several other points mentioned in the prospectus but the Company feels that they pertain to mountain and foothill strips upon which the Company will not comment because of lack of experience.

In general the drainage and water problems of the prairie strips are minimal and because of the low sulphur content of the coal do not create any pollution problems. In some cases it may be necessary to drain sloughs or small lakes which have only a small area in proportion to the total watershed and if it is thought desirable may be replaced in one form or another during the reclamation.

In closing, the Company would like to reiterate that it believes the advantages of prairie strip mining to the people of the Province are substantial and that with reasonable reclamation it can be carried out with minimal disturbance to the environment with equal, if not improved, use of the land.

APPENDIX "A"

WHITEWOOD MINE

The coal mining properties and leases owned or controlled by Calgary Power Ltd. and known as the Whitewood Mine, lie in Township 53, Range 4, West of the Fifth Meridian, some 40 miles west of the City of Edmonton, on the north side of Lake Wabamun.

Calgary Power Ltd. carried out preliminary investigations of the coal field near Wabamun in 1950 to determine the feasibility of locating a coal fired steam plant in the area. Further field investigations and subsurface drilling to determine the location and extent of the coal reserves were carried out during the period 1953 to 1964. Final plans for developing the Whitewood Mine for mining operations were begun in 1957 as a result of the decision by Calgary Power Ltd. to expand the Wabamun Steam Plant by the installation of coal fired steam units. There are now three coal fired steam units at the Wabamun Steam Plant; one 66 MW unit, one 150 MW unit, and one 300 MW unit.

A coal mining contract was completed with Alberta Coal Ltd. in early 1959 for the stripping of overburden, mining and delivery of coal to the Wabamun Plant for the period 1962 - 1972. Under this mining contract Calgary Power Ltd. provided, when required, the following major mining equipment:

W1350	Electric Walking Dragline	33 cu. yard capacity
7400	" " "	10 " "
150B	Crawler "	5 " "
71B	" " "	3½ " "
110B	" " Shovel	7½ " "
71B	" " "	5½ " "
5 - 36LDT	Coal Haulers	51 ton capacity
2 - 34LDT	" "	56 " "

In May, 1962 mining operations commenced in Section 14 with the stripping of the coal in an initial box cut approximately 90' wide and 7500' long (subsequent turnover cuts are also 90' wide). Coal loading and hauling to the power plant began in September and the first electrical energy from coal at the Wabamun power plant was developed on September 25, 1962. The Wabamun steam plant normally operates at a very high load factor as a base load plant and the coal burning units (Nos. 2, 3 and 4) are operated in preference to the No. 1 unit, which is gas fired. The following quantities of coal have been consumed each climatic year (Oct. 1 to Sept. 30) to date:

<u>Year</u>	<u>Tons of Coal</u>
1962/63	404,368
1963/64	650,368
1964/65	878,875
1965/66	1,091,448
1966/67	1,111,681
1967/68	1,716,701
1968/69	2,062,918
1969/70	2,407,051
1970/71	<u>2,187,424</u>
	12,510,834

Calgary Power Ltd. also installed the necessary facilities to provide two sizes of coal to the local residents for domestic use. This market amounts to approximately 3,000 tons per year and is included in the above figures on consumption. The proposed production of coal from the Whitewood Mine for the Wabamun Plant is:

<u>Year</u>	<u>Tons of Coal</u>
1971/72	2,247,000
1972/73	2,444,000
1973/74	1,607,000
1974/75	1,969,000
1975/76	2,140,000
1976/77	1,635,000

Before the 'dozers clear the land for the large dragline to commence the stripping operation, the local residents, for a nominal price, log the area and sell the timber to a local building products plant. The mining contract also calls for the Contractor, Alberta Coal Ltd., to salvage salable gravel where it is encountered in the course of stripping the overburden from the coal.

Calgary Power Ltd. started planning for surface reclamation with the commencement of mining operations. Plate 1 shows an aerial view of the mining area in 1961 before the stripping operation commenced. This shows the area to be a series of muskegs and scrub forest areas with only a few fields that are used for hay and other crops.

In 1963 an area of approximately five acres was planted to try various mixtures as an experiment. Six varieties of grasses and legumes were tried (brome, timothy, red fescue, alfalfa, alsike and crested wheat) and the alfalfa seemed to grow the best. We also planted over 300 seedling trees of 10 different species. The results were poor but the honeysuckle and willow have survived the best.

In 1966 we experimented with individual types of seed rather than a mixture of various seed on an area of 30 acres that had been prepared by 'dozer in the mined out area. The alfalfa again showed the best results. In 1969 we seeded 150 acres and in 1971 we seeded another 200 acres of mined out land with alfalfa. The procedure prior to seeding is to use a 'dozer to knock down the high peaks and fill the valleys of the piles of overburden left by the large dragline. After the land is formed into rolling contours, the area is dragged to level the ridges left by the 'dozer tracks and then seeded, using a farm tractor and seeder.

Plate II* shows the mining area in 1966 after four years of operation. At that time we had mined approximately 140 acres and we were just beginning to have enough area mined out to start a program of developing the rolling contours that were required. The area mined out has now covered approximately 600 acres and approximately 400 acres have been reclaimed. Plate III* is also shown in colour and the green area is the 1969 seeding. The 1971 seeding will now show green until next year. The aerial photos also show the reclamation and seeding that was done south of Highway 16 in the area mined prior to the start of the Whitewood Mine in 1962. The actual cost per acre for reclamation is difficult to establish as various areas of the mine are in different stages of reclamation. However, based on the 400 acres mentioned above, plus areas partially reclaimed, the cost per acre has been approximately three times the original cost of the land when purchased by Calgary Power Ltd.

* Not included with these proceedings but available in the Information Centre of the Environment Conservation Authority.

HIGHVALE MINE

The Highvale Mine is located in Township 52, Ranges 4 and 5, West of the Fifth Meridian, on the south side of Lake Wabamun approximately six miles from the Whitewood Mine.

Calgary Power Ltd. carried out exploratory drilling and investigations in 1960 and 1963 in the area. In the fall of 1965 a large scale drilling and investigation program was started in preparation for the development of the Highvale Mine.

In 1970 a coal mining contract was completed with Alberta Coal Ltd. for delivery of coal to the Sundance Steam Plant. Under this mining contract Calgary Power Ltd. provided the following mining equipment:

7800	Electric Walking Dragline	30 cu. yard capacity
2 - 120B	Electric Crawler Shovels	7½ cu. yard capacity
5 - 34LDT	Coal Haulers	56 ton capacity.

In July, 1970 mining operations commenced with the stripping of the coal in the initial box cut. Coal loading and hauling to the power plant followed and the first coal was burned in October, 1970. The quantity of coal consumed to September 30, 1971, was 927,839 tons. The proposed production of coal from the Highvale Mine for the Sundance plant is:

<u>Year</u>	<u>Tons of Coal</u>
1971/72	1,365,000
1972/73	1,365,000
1973/74	1,990,000
1974/75	2,730,000
1975/76	2,730,000
1976/77	4,430,000

Reclamation at the Highvale Mine has commenced in some areas. The spoil piles from the initial box cut in one area were levelled and made into the permanent access road to the Sundance plant. In another area an abandoned coal pit was filled with overburden material from the initial box cut and the first turnover cut. In a third area the overburden from the box cut was re-handled into the worked-out pit to minimize the height of the spoil piles. The planned reclamation will follow the same pattern that has been established at the Whitewood Mine. However, any major reclamation will not take place for a few years until there is sufficient area available and mine haul roads have been re-located away from the area to be reclaimed. The area mined to September 30, 1971, was approximately 34 acres.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

Would you elaborate on reclamation as you said that, at Whitewood, you believe you have improved by your reclamation on the original condition of the land.

MR. T.D. STANLEY

There is a good bit of the Whitewood mine area which is muskeg. It was inaccessible for any use at all and really had no use. It grew some stub trees which were salvaged and used in the board plant near the Wabamum Plant. The area is now a rolling area in which a car or truck can be driven at any time. It ultimately will be accessible to the public but, because of safety reasons and configuration of the mine, it is not now so. It could even be used right now as a grazing area with alfalfa growing. There have been suggestions to develop it into a recreation area. I'm sure that many snowmobile lovers would love to run over those rolling hills.

DR. WALTER TROST

You have made a point that stripping operations in the prairies generate products which are used in the province totally. What are estimates of the costs of reclamation and how will they bear on the cost of the power that is the final output?

MR. T.D. STANLEY

The cost of power is a whole study in itself. I think that it is quite evident that the cheaper the source of energy, the cheaper the cost of power. You get into the question of public utility financing in which a rate of return is allowed on capital. If this is an operating expense it comes indirectly and the cost of reclamation is now a very great item in the total.

DR. WALTER TROST

It seems to me your basic position has been that although regulations should be flexible, reclamation to a certain agreed-upon level should nevertheless be done.

MR. T.D. STANLEY

Reclamation, I think, is part of the whole picture. The point I was trying to make is the end result, the method of getting there. To disturb a mining plan too greatly during the mining operation could well increase costs greater than

doing what would amount to extra work on reclamation. And the same thing applies in the design of spoil piles. The original design of the spoil pile should be for the mining plan and reclamation comes after. We have found this in the workings at Whitewood mine; that you had to feel your way along. I am certain that no one could have drawn out the complete reclamation plan for the Whitewood mine before we started. You have to follow your experience, your experiments, and your consultations with agriculturalists and other experts in the field. It was only as we worked along that the method became clear. It may not apply even over the whole area of the mine, I am sure that different areas will have to have different approaches.

DR. WALTER TROST

I was interested in the emphasis you placed on the practicality of integrated planning: planning the mining and the reclamation in the overall package; and then how you led into the concept that after reclamation the land will be used again presumably, if it is farmland, it will be turned over to a person who will farm it.

MR. T.D. STANLEY

It would likely depend on the grade of farming that was there before. Forage crops of course, are one of the easiest ones. You get to the point of where does reclamation end and development begin? The same thing could even depend on farmland, you do the basic work and then maybe it can be developed that you can get back to the value that it originally was and maybe a little more work will enhance this value. Is that development or is that reclamation? You can't generalize since the realm of each mine is so unique. I can't see recreation at the Highvale Mine at the south shore of Lake Wabamum because of the layout and location of the mine while I can see reclamation becoming a part of the Whitewood mine.

MR. PAUL BABEY

You mentioned that reclamation should follow closely behind the mining activity. I was wondering, in your experience in Whitewood, what time lapse is there between the opening of the pit and the completion of reclamation.

MR. T.D. STANLEY

We started operating there in 1962, but it was 1966 before we had enough room to start a reasonable reclamation program. We started south of Highway 16 to clean up some of the previous mining operations. If you look at the pictures of south of the highway, you would hardly realize that there has been anything disturbed there. We seeded some 200 acres last year. Because of weather we lost a year in seeding and whereas we have some 640 acres disturbed, we now have some

00 acres seeded. From now on we will keep right up but there is a time lag particularly in a new mine. You have to have room to operate the mine and do reasonable amount of stripping. You can't go and level one pile because it doesn't produce a good result.

R. STUART SMITH

Does it matter, in your opinion, whether the land is crown land or private land? Should all land be reclaimed?

R. T.D. STANLEY

es, I don't think that comes into it. Mind you the land in which we are experienced is all land that the company has purchased. We are not in the forest reserves, but I don't think it should make any difference, as a matter of opinion.



EDMONTON CHAMBER OF COMMERCE

December 15th, 1971

3.3

SUBMISSION

TO

ENVIRONMENT CONSERVATION AUTHORITY

PROVINCE OF ALBERTA

ON

THE ENVIRONMENTAL IMPACT

OF SURFACE MINING IN ALBERTA

The Chamber of Commerce is pleased to have the opportunity of making a submission on this important subject.

The Chamber submits that land utilization should be decided on the basis of the maximum benefit to Albertans and Canadians. An important part of this decision should include consideration for the preservation of the environment which should be evaluated on the basis of cost benefits.

The Chamber recognizes that surface mining changes the contour of the area affected however, under some circumstances, such changes can provide alternative benefits. For example, some of the resultant changes may create new lakes which can be used for fishing or other summer sports and in addition, may be used for winter playgrounds. Where reclamation is necessary, several techniques are available for the purpose.

The proposed act should include:

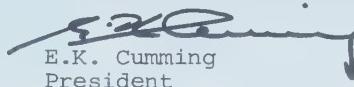
- a) The degree of reclamation required for specific mining operations should include the geographic location of the site.
- b) There should be provision for adequate time lapse to reclaim the area. Reclamation procedures should provide assistance to regrowth.

. . . 2/

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- c) Where Legislative controls are necessary, industry should be informed in advance of reclamation requirements prior to the commencement of operations in order that they are fully aware of their responsibility and the cost thereof. The Chamber recommends combined research of Government and Private Enterprise on methods of reclamation for various types of resource extractions.

The Chamber respectfully submits that where productive surface mining can be successfully carried out, with proper consideration of the environment, then permission should be granted for industry to carry out this mining, without imposing prohibitive regulations which would discourage development.



E.K. Cumming
President

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

I am interested in your statement on adequate time lapse to reclaim the area. Mr. Stanley had a comment to make on this as well. Have you a rough period of time that you are thinking of, one year, 10 years, 50 years?

MR. E.K. CUMMING

No. We believe that the time lapse should be adequate to allow economic and properly planned mining procedures. I believe Mr. Stanley covered that quite well, but our view is that there should not be unnecessary haste at the cost of the product produced.

MR. PAUL BABEY

Is it the view of the Chamber that increased reclamation research is essential for improving reclamation procedures?

MR. E.K. CUMMING

Yes. Our people feel that there is a good deal of study needed; that this should be done by a specific study or deal with specific problems of specific mines, not generalized problems. We suggest that there should be a cooperative research effort by government and the enterprise involved.

DR. STUART SMITH

In the second paragraph of the brief you submitted, you have the statement that the land utilization should be decided on the basis of maximum benefit to Albertans and Canadians. Would you care to expand on that?

MR. E.K. CUMMING

We believe that all decisions should be made on the basis of cost-benefits and that we should obtain the maximum benefit. We believe that there is a need for objectivity in determining benefits and that the benefits should be carefully measured on an economic basis. We believe that it is possible to quantify

environmental benefits, recreational benefits, and also to quantify the disadvantages if any.

DR. WALTER TROST

Do you think that applies, for example, to the impact on the tourist trade in the mountains?

MR. E.K. CUMMING

Yes. I think it's quite possible this can be quantified. I think if you made a survey of the people who looked at some of the developments that have received press as being quite objectional and you will be able to measure it. I suggest that the effect would be insignificant in terms of coming to the area and enjoying it.

3.4

SUBMISSION PRESENTED BY

LUSCAR LTD.

TO ENVIRONMENT CONSERVATION AUTHORITY

Public Hearings on

"The Environmental Impact of
Surface Mining in Alberta"

Edmonton
December 17, 1971

INTRODUCTION

Luscar Ltd. fully endorses these public hearings on the subject of the environmental impact of surface mining in Alberta, and welcomes the opportunity to present comments. We regard these hearings as a constructive step towards evolving a sensible approach to what has become a frustrating matter for the public, government and industry alike.

Luscar has a vital interest in this whole subject, and can comment on the basis of 60 years in the Western coal mining industry:

(a) The company is active in each of the three distinct mining regions in the province:

(i) Mountain Region:

- Luscar operated the former Mountain Park mine from 1912 to 1950;
- Luscar operated the former Luscar mine from 1921 to 1956;
- the surface mine opened at Luscar, Alberta in 1969 by Cardinal River Coals Ltd. is a joint (50/50) venture of Luscar Ltd. and Consolidation Coal Company of Canada.

(ii) Foothills Region:

Luscar has plans to open a bituminous property as soon as market conditions warrant.

(iii) Plains Region:

- Forestburg Collieries Ltd., a subsidiary of Luscar Ltd., has operated a surface mine near Forestburg since 1949, and this year acquired the Kleenbirn Collieries mine near Kitsim, Alberta;
 - another subsidiary, Manitoba and Saskatchewan Coal Co. Ltd., produced over 900,000 tons of lignite at a mine in southern Saskatchewan last year, and will shortly open another mine to produce up to 1,850,000 tons of lignite per year;
 - the company also owns and operates a plant at the Saskatchewan coalfield which converts lignite to coal char and fuel briquettes.
- (b) Luscar Ltd. has extensive coal reserves throughout Alberta. Many leases have been held for years (some for more than 50 years) at considerable cost to the company. The company retained its coal properties even during the most depressed years of the coal industry; had it and a few others not done so, the recent resurgence of the industry would have been more difficult to achieve.
- (b) Luscar is deeply involved in the formidable problems of marketing the coals of Alberta, both in Canada and internationally. It is worth noting how many companies and individuals are now involved in the search for coal deposits, but

how comparatively few are actively engaged in bringing coal properties into production; fewer still have experienced the whole difficult process of opening a mine and maintaining production.

In view of the company's background and present scope of operations, we believe Luscar has the credentials to speak knowledgeably about the practical side of the issues under consideration at this hearing.

Unfortunately, any discussion of environmental issues tends to become polarized all too quickly. Those who express any reservations about going to the extreme with reclamation efforts tend to be branded as callous or indifferent toward the environment, and opposed to reclamation and environmental control.

We want to make our position abundantly clear from the outset of this presentation: our company fully recognizes the need for environmental control and regulation, and believes in reclamation - in fact we practice it.

At the same time, our role in the economic life of the province is to develop coal resources. Left in the ground, such resources have no more than latent or potential value. Our job is to convert these resources into real value, to the benefit of all in the province.

This is by no means as easy a task as it may popularly be imagined to be. We in Alberta have more than enough economic hurdles to overcome as it is, without going out of our way to create any more than necessary. Our concern is that over-zealousness in the area of

environmental regulation and control could easily have more adverse and even drastic consequences than is realized.

We believe that our main contribution to these hearings should therefore be to point out the potential pitfalls and practical consequences of what might be undertaken, and to clear up certain misconceptions regarding the industry.

I SUMMARY OF MAJOR COMMENTS AND RECOMMENDATIONS

1. Luscar fully supports the proposition that the mining industry in the province should in future be required to restore to an appropriate condition land disturbed by surface mining operations. We therefore welcome action by the government at this time to formulate legislation and regulations, and to establish the organization and mechanism for effective administration. We fully agree it is essential to maintain a balance between environmental and economic considerations.
2. We agree with the concept of a planned approach rather than remedial efforts after the fact. The starting point should be for the owner of the land to select an end use or uses compatible with the terrain and environmental factors. This should be followed by:
 - (a) the planning of mining and reclamation operations to achieve the appropriate surface contour, which would not necessarily be the original contour;
 - (b) the planning of measures to revegetate the disturbed land surface.

3. It is vitally important that in devising reclamation requirements, full recognition be given to economic realities. We are afraid, however, that there are a number of misconceptions regarding the economics of the industry which need to be clarified:

- (a) In the benefit/cost equation, we doubt it is fully understood how widespread are the economic benefits derived from the industry, or the industry's potential for contributing to employment.
- (b) The coal industry in Alberta faces a far more competitive and difficult marketing situation than is popularly supposed.
- (c) Economically recoverable deposits of coking coal in the province are much scarcer than may be realized.

4. We would like to encourage the government to introduce appropriate regulations in writing to guide reclamation activities, subject to the following:

- (a) an unusual degree of flexibility will have to be incorporated in such regulations because of the wide variety of conditions encountered in the province;

- (b) development of regulations about revegetation in the mountains will have to await the results of further research efforts and experimental plantings;
 - (c) it must be recognized that reclamation regulations have to be tailored to the conditions of each distinct area; it would be a mistake to attempt comprehensive regulations to be applied universally throughout the province, or to impose regulations designed for conditions different from those of Alberta (e.g. highly acid conditions of the US Appalachian region).
5. We welcome the present opportunity to comment in advance on the proposed legislation. It is equally important that the industry be given an opportunity to comment on the corresponding regulations which will stem from the legislation. We also urge the government to allow the industry the right to appeal unreasonable or unworkable regulations.
6. There are certain features of the proposed legislation which we recommend be reconsidered:
- (a) We disagree that there is any necessity for expropriation of surface and/or mining rights by the government in order to deny their use by industry.

- (b) The proposal whereby the government would acquire mineral rights through exchange would seldom be practical.
- (c) We would have to object in the strongest possible terms if the provincial government intends to expropriate or otherwise acquire leases or other mineral interests granted by the Federal government prior to 1930.
- (d) It would create much uncertainty and jeopardize development of the province's coal reserves if the Minister were to be authorized to prohibit surface mining on "cultural, scenic or aesthetic grounds"; we are opposed to any such provision in the forthcoming legislation.
- (e) We urge the government to give the industry an opportunity to participate in the development of regulations pertaining to the proposed legislation.
- (f) The industry should have the right of appeal in connection with regulations.
- (g) Comprehensive environmental planning before issuance of a coal lease and/or before issuance of an exploration permit would be impractical and unwarranted.

- (h) With regard to the idea of reclaiming "simultaneously with operations", it would be impractical to expect reclamation to follow directly on the heels of the loading of coal from the seam; a reasonable time interval is needed between mining and reclamation.
 - (i) Retroactive responsibility for reclamation of previously disturbed land should extend no further back than 1963 when the Surface Reclamation Act was proclaimed.
 - (j) The notion of mineral rights as a "privilege" which could be withdrawn by the government would constitute a fundamental change, the implications of which should be most carefully considered. If this concept is to be adopted, we believe a distinction needs to be made between existing leases and leases which may be issued in future.
7. We recommend that more flexibility be permitted in future than has been allowed to date in the matter of diverting minor water courses in the vicinity of surface mines.

8. Test pits opened in the course of exploration work should be allowed to remain open longer than is permitted at present.

While the foregoing summarizes our major comments and recommendations, the submission which follows contains a number of additional comments and suggestions, as well as explanatory material which may be of interest to the Authority.

* Illustrations are not published in the proceedings, but are available in the Information Centre of the Environment Conservation Authority.

II CONTRIBUTION OF THE COAL MINING INDUSTRY TO ALBERTA'S ECONOMY

What we are dealing with is essentially a benefit/cost analysis.

The benefits tend to be mainly economic, the cost mainly in the area of environmental disturbance. This type of benefit/cost relationship is equally applicable to many other familiar situations; for example:

- logging
- farming
- oil and gas exploration and development
- highway construction
- hydro-electric power projects
- thermal power generation
- electrical transmission lines.

The prospectus which was prepared by the Authority to set the stage for these hearings stressed the need for "balance". That is indeed the key. The prospectus also stated that "no one will deny the economic benefits . . . ". However, we are not persuaded that it is in fact adequately recognized how widespread and substantial the benefits really are.

A fair and objective recognition of the scope and scale of economic benefits must take into account all the following:

- direct employment at the mines
- indirect employment with suppliers of materials and services, railways, terminals, etc.
- railway operations
- bulk terminal operations
- equipment manufacturing
- construction of mine facilities, highways and railways

- power generation and transmission
- taxes paid to municipal and provincial authorities
- lease rentals and royalties paid to the provincial government and individuals
- sponsorship of research and development projects.

While this point can and should be expanded, we will not endeavor to do so at this time. However, the contribution which our industry is making to employment, and the significantly larger contribution it can make (and will make, given an opportunity to do so) to the employment situation warrants emphasis. This is particularly important at a time when the Economic Council of Canada estimates that the nation is faced with the massive problem of finding 1,400,000 new jobs by 1975. Our industry's contribution to the employment picture has been unjustifiably belittled. Perhaps it is sufficient to point out that the Cardinal River operation, while now in only the 21st month of a 15 year contract, has already provided on the order of more than 900 man-years of direct employment within Alberta and very substantially more if employment in service and supply industries is taken into account.

Elsewhere in Canada, the concern regarding employment is such that the federal government subsidizes coal production at Cape Breton, Nova Scotia, to the extent of \$25,000,000 per year (\$13.75 per ton produced) in order to maintain employment for 4,000 workmen; this is equivalent to \$6,250 per year for each man employed. This is by no means the only such subsidy paid in Eastern Canada. In contrast, our company and others in the industry in Alberta are creating new employment - and are doing so

unassisted. All we ask is not to be unduly hindered in the process.

It seems to us that the value of jobs generated by industry without assistance must be taken into account in the benefit/cost analysis. To the extent that the number of jobs so created is less than the number required to achieve a reasonable level of employment nationally, governments in Canada evidently feel increasingly obliged to spend very large sums to stimulate employment. In other words there is a decided cost associated with inhibiting the development of an industry such as ours which can contribute importantly to employment.

III HIGHLY COMPETITIVE MARKET SITUATION

Publicity in connection with developments in the industry over the past two years or so have given rise to a popular misconception to the effect that a world hungry for coking coal and energy is eagerly lining up to place orders for coal from Alberta. Unfortunately, in reality the situation is very different. Alberta producers face an extremely competitive situation in the several possible markets for their coal, and encounter stiff opposition in the struggle to obtain a foothold in additional markets.

Potential markets for coking coal from Alberta are to be found in Japan, Central Canada and Europe. So far, the only actual lasting achievement of the industry has been to break into the Japanese market for coking coal. Costs and competition from elsewhere have prevented Alberta producers from winning contracts in other markets. Until as recently as a few months ago, Japan appeared to offer ever-increasing scope as a consumer of Alberta coking coal. Now that market is so depressed that the Japanese are not even interested in discussing additional tonnage. In fact, the Alberta industry is doing well not to have been obliged to slow down on deliveries, as US suppliers have had to do.

Only a fraction of Alberta's coal reserves are of coking coal quality. Most of our coal is steam (thermal) coal; Western Canada, Central Canada, Japan and Europe might be regarded as the main potential markets for such coal. Costs of exploration, production and transportation continue to limit to Western Canada the market for our steam coal. Even Central

Canada remains out of reach: a recent and thorough market study concluded that the price which Western steam coal could bring in Central Canada would no more than cover transportation costs, leaving nothing for mining costs.

The formidable competitive factors which stand in the way of broadening our markets include the following:

1. Australia has become a major competitor as a source of coking and steam coal. In the first half of 1971, Australia supplied 8,200,000 tons of coking coal to Japan, compared to only 3,500,000 from Western Canada. Their geological conditions are more favorable than ours and this permits lower cost mining than in the mountain regions of Alberta. The Australian mines are much closer to tidewater than the Alberta coal, and do not have to contend with the severe winter conditions found in Alberta. In the expanses of Australia, operators seem to be obliged to pay little or no regard to environmental considerations. Ocean shipping distances from Australia are no greater than from Western Canada to Japan or to Europe (for larger vessels which cannot transit the Panama Canal).

2. With their shipments to Japan being curtailed, U.S. suppliers of coking coal are looking harder at alternative markets and this is creating an even more competitive situation for Alberta producers.
3. B.C. has extensive coal reserves and these are closer to tidewater than the Alberta deposits.
4. The cost of moving coal from Alberta to Central Canada is four or five times greater than the cost of moving competitive coal from Eastern U.S. sources into the same area.
5. Large surface mines are being opened in the Western U.S. from New Mexico to Montana. These have cost and tax advantages over Alberta mines, and they virtually preclude the sale of coal from Alberta to the U.S. Northwest.
6. The market for coal is the energy market, and coal is thus in tough competition with natural gas, oil, hydro and nuclear power. As an example, it might be noted that the Clover Bar generating station of Edmonton Power, which was opened only last year, is gas-fired despite its proximity to the coalfields in the Edmonton vicinity.

The point which we wish to make is that, notwithstanding high hopes and optimistic projections, the coal industry in Alberta faces intense competition and will have an uphill struggle to achieve its aspirations. The key to marketing is of course production and transportation costs and therefore the prices at which the coal can be offered. It must be realized that any measures which increase the cost of mining coal in Alberta will have the effect of diminishing the market potential of that coal and therefore restrict the growth potential of the industry. It would be a mistake to proceed in the belief that the industry can expand and contribute in increasing measure to the economy and employment regardless of the regulations and standards imposed upon it.

The fact that there are not more producing mines in Alberta today is not for want of trying by the industry, nor is it for lack of coal deposits or potential markets - the truth of the matter is that the coal cannot be sold at prices commensurate with the costs of mining and delivering it.

IV COMMENTS ON PROPOSED LEGISLATION

The "draft position statement" issued by the Department of the Environment on November 19, 1971 has provided only a sketchy indication of the legislation under consideration. It is difficult to comment when the full meaning and implication of many features is unclear. Nevertheless, we wish to offer the following comments on the basis of what can be read into the Department's release.

1. Para. 4.01/4.02 - Expropriation of Surface and/or Mining Rights by the Government in order to deny their use (by industry).

We disagree there is any necessity for recourse to as extreme a measure as expropriation. Let there be environmental standards which must be met. If the economics of a particular situation make it feasible to meet these standards, then industry should be allowed to proceed; if the standards cannot be met, industry will not proceed. There is no need beyond this for the government to prohibit industrial development through expropriation.

It seems to us that, in the Alberta context, such expropriation powers would be incongruous and wholly inconsistent with a policy of economic development and also with a reputation as a province where conditions are conducive to economic development.

If (regretably) the expropriation provision does remain in the legislation, surely the specific circumstances under which such powers may be used will be clearly defined for the protection of all concerned.

2. Para. 4.01/4.02 - Acquisition by the Government of Mineral Rights through Exchange.

In the mountain region, the idea that the government could acquire mineral rights by offering to exchange mineral rights at some other location could rarely be expected to be practical because of:

- the scarcity of economically recoverable deposits of coking coal;
- the difficulty of equating deposits because of the many variables involved.

From time to time, reserve estimates appear which indicate very substantial reserves of coking coal along the western fringe of Alberta. Coking coal can indeed be found at varying depths along the formation from the Crow's Nest in the South to the Peace River in the North, and reserves have been estimated to a depth of some 3,000 feet. However, there are disappointingly few deposits of economically recoverable coking coal in Alberta, when one takes into consideration:

- the small proportion recoverable by surface mining methods, a more efficient and thus lower-cost type of mining than underground methods
- the extent to which the structure of these coal deposits has been distorted geologically, rendering it impractical to mine much of the coal
- the difficulty of road and rail access
- the extent to which coal quality varies along the formation with respect to ash, volatile matter, moisture, swelling index, fluidity etc.

3. Para. 4.04 - Acquisition by Provincial Government of Mineral Interests Granted by the Federal Government.

It is not at all clear what this means. Our company holds many coal leases issued originally by the federal government prior to 1930 when such matters were within the jurisdiction of that government. In the course of the routine renewal of such leases subsequent to 1930, the leases were reissued by the provincial government. We also have freehold property (surface and mineral rights) acquired prior to 1930. Our company still retains many of the original leases issued to the early prospectors of the Luscar and Mountain Park areas, and lease rentals and royalties have been paid on these to the prospectors and their beneficiaries and to the Crown for more than half a century.

We would object in the strongest possible terms to any suggestion that the provincial government now intends to take such leases and property away from us.

4. Para. 4.10 - Power of the Minister.

The proposed legislation would authorize the Minister to prohibit surface mining on cultural, scenic or aesthetic grounds.

By all means let there be environmental safe-guards and controls, in the form of objective standards which can be defined and properly administered. But "cultural, scenic or aesthetic grounds" are entirely too subjective and discretionary to be fairly and equitably administered. Such a provision in the legislation would result in much uncertainty and would jeopardize development of Alberta's resources (not coal alone). We urge that it not be incorporated in the forthcoming legislation.

5. Para. 4.08/4.09 - Regulations and Guidelines.

We trust that not only will the legislation provide for regulations, but practical regulations will in fact be issued. It creates great difficulties for both industry and those responsible for administration of the legislation when constructive regulations are lacking, as they are at present.

We regard the development of such regulations to be as important and challenging a task as the drafting of the relevant legislation. The fact that the present hearings are taking place indicates that the government subscribes to the principle of informed participation in such matters. We urge the government to give industry a similar opportunity to contribute to the process of developing regulations. No one wants impractical regulations; they are frustrating for the enforcement authorities and disruptive - indeed potentially disastrous - for industry. The surest safeguard will be to provide for industry/government consultation as regulations are being formulated.

6. Para. 4.03 - Arbitration and Appeal.

The proposed legislation provides for arbitration and appeal with regard to:

- acquisition by the government of mineral and surface rights
- implementation of plans and approvals.

It is equally important that there be provision for the right of appeal in connection with regulations.

7. Para. 4.06 - Application and Approval.

We agree with the planned approach to restoration of the surface of land disturbed by surface mining operations. Our concept of this approach is that it involves three primary phases:

1. Before mining operations begin, the owner of the land surface (i.e. the government in the case of public lands, the land owner in the case of patented or private land) selects an end use or uses compatible with the terrain and environmental conditions.
2. The planning of mining and reclamation operations to achieve the appropriate surface contour, which would not necessarily be the original contour.
3. The planning of measures to revegetate the disturbed land surface.

Such plans should be developed by the operator of a proposed mine and submitted to one agency designated by government.

Para. 4.063 seems to provide for the foregoing planning process, prior to the commencement of mining operations.

In addition, Paras. 4.061 and 4.062 appear to provide for similarly comprehensive environmental planning at two earlier stages:

- (i) before issuance of a coal lease
- (ii) before issuance of an exploration permit.

We submit that it would be premature and impractical to expect comprehensive planning at such an early stage. Exploration activity is already very tightly regulated and subject to prior approval by the government (see part VII of this submission) so there is little or no risk of lasting environmental damage. The operator is in no position to present a case for development of a property until it is known to what extent, if at all, there is a deposit of economically recoverable coal on the property. To be practical, the kind of planning envisaged in Para. 4.06 will of necessity have to await the outcome of exploration activities.

8. Para. 4.07 - Reclamation "Simultaneously with Operations".

We agree that reclamation activities should be conducted as an integral part of surface mining operations. The use of the word "simultaneous" suggests, however, reclamation activities following directly on the heels of the loading of coal from the seam. If this is indeed the intention, it should be pointed out that this would be wholly impractical. Neither seasonal weather conditions

nor the sequence of mining operations would permit reclamation to proceed immediately after the removal of coal.

In the plains region, a practical approach would be to allow the operator to maintain an unclaimed strip of three spoil ridges between the open pit and the edge of the reclaimed area. Even this could be too tight in the case of a multiple-seam mine.

9. Para 4.11 - Retroactive Application.

In our view the retroactive feature referred to should extend back no further than 1963, when the present Surface Reclamation Act was proclaimed. To go further back would be to discriminate against a few existing operators who have survived from an earlier era of coal mining in the province.

A number of mine operators in the province has declined drastically:

	<u>Number of Mines</u>
1930	301
1940	278
1950	207
1960	69
1970	26

Each of the operators, in their time, operated in accordance with the laws and accepted practices of their period. Practically all (our company being one of the few exceptions) have by now passed out of existence.

It seems to us it would be grossly inequitable if the few surviving operators should be called upon to apply retroactively the reclamation standards of today. To do so would penalize these few operators and place them at a competitive disadvantage.

10. Para. 4.12 - Security Deposit.

It might be noted that Cardinal River is already required to submit a security deposit of \$500 per acre to guarantee reclamation, so this feature (like many others) should not be regarded as something new.

11. Paras. 4.13/4.14 - Satisfactory Reclamation.

These paragraphs refer to the criterion of "satisfactory reclamation". This underscores the necessity for regulations to define what will in fact constitute "satisfactory reclamation".

12. Para. 3.3 - Consolidation.

The Environment Conservation Authority has stressed the need for a balanced approach in this whole matter, and we know from experience how essential this is in respect to administration and enforcement. It is very reassuring, therefore, to find in this paragraph an indication that administration will be inter-departmental and that measures will be taken to avoid unilateral action by any one department. We consider this to be very important.

We would hope that the consolidation process referred to will include rationalizing existing legislation pertaining to reclamation. The existing legislation is fragmented to the point of confusion. For example, the following all have a bearing to some extent on surface mining and reclamation activities:

- Coal Mines Regulation Act
- Surface Reclamation Act
- Mineral Surface Lease Regulations of the Public Lands Act
- Department of the Environment Act
- Clean Water Act
- Forests Act
- Canada Water Act
- Fisheries Act.

A new consolidating Act may be warranted; yet another Act in addition to the existing ones would not be.

13. Para. 2.4 - Compensation required for Environmental Damages.

The statement that the "resource user" (an expression which apparently means the mine operator) would be required to bear the financial cost is an oversimplification which should be examined.

To the extent that the proposed legislation requires more extensive and more costly reclamation than in the past, the additional cost entailed will have one of the following effects:

- (a) As in the case of any cost increase, the operator will endeavor to pass the cost on to the ultimate consumer of the coal in the form of a price increase, to whatever extent it may be possible for the operator to do so and still remain competitive.
- (b) In many cases, mine operators supply coal under longterm contracts. Where these contracts do not permit such cost increases to be passed on in the form of price escalation, the operator will be forced to absorb the additional cost.

(c) The increased cost will mean that the market for Alberta coal is diminished; that is, there will tend to be a loss of existing or prospective markets to producers outside of Alberta or to other fuels.

14. Para. 2.5 - Privileges as Opposed to Rights.

Quite apart from the merits of what is implied by this section, it must be recognized that it would involve a fundamental change in the concepts which have applied until now. We therefore believe that a distinction should be made between existing leases and leases which may be granted in future.

With regard to future leases, a prospective lessee will presumably be on notice from the outset regarding the conditions which will apply to the lease and can assess the situation before entering into the lease.

The lessee of an existing lease, on the other hand, is already locked into a lease in which he probably has accumulated a substantial investment in the form of:

- exploration and drilling costs
- reservation fees paid to the Provincial Government
- in some cases, the cost of acquiring the lease from a previous lessee

- annual lease rental charges paid to the provincial government
- the cost of efforts to develop a market for the coal on the property.

Regarding the nature of mineral interests, it should be noted that according to existing coal leases "Her Majesty hereby grants unto the lessee the exclusive right to win and work all mines, seams and beds of coal in, on, or under the lands more particularly described as follows". Does the provincial government now intend to repudiate such rights, after existing lessees have invested heavily to acquire and maintain them?

To summarize our views of the proposed legislation, it seems to us that, apart from certain incongruous features negative in character, it would add little not found already in existing statutes. What is needed now is not more legislation but rather practical regulations and guidelines and organization for effective administration.

V SURFACE MINING IN THE PLAINS REGION

Forestburg Collieries Limited, a subsidiary of Luscar Ltd., has operated a surface mine near Forestburg since 1949. We would like to refer to this mine as an example of surface mining in the plains region, and also to comment on our experience with reclamation at that location.

Illustration A* is a cross section through the pit, to show how the mining operation is carried out.

Prior to 1949, coal was mined from the property by underground means. Since 1949, almost 8,000,000 tons have been removed by surface mining; the total area disturbed in that time is 1,070 acres or 1.67 square miles. The mine currently produces between 600,000 and 700,000 tons per year and this involves removing overburden from 70/80 acres per year.

The following summarizes the present state of the area which has been disturbed by the mining operations over the past 22 years:

- (a) 618 acres (the area mined between 1949 and 1965) have been seeded, after working down the tops of the spoil piles with a dozer. This was the reclamation practice approved by the authorities until 1967, when the Surface Reclamation Council instructed the mine that the valleys between two ridges of the spoil piles were thereafter to be no deeper than five feet.
- (b) about 200 acres have been contoured in accordance with the 1967 instructions of the Council; more than half of this has

been planted with trees and seeded, and the balance is ready for planting next Spring.

- (c) 90 acres have been levelled to create an airstrip; the balance of the disturbed acreage is either in the process of being mined or awaits grading prior to seeding.

During the past three years alone, some 18,000 trees have been planted in the course of restoration. The species used include:

- Caragana
- Russian Poplar
- Manitoba Maple
- Green Ash
- Colorado Spruce
- Manchurian Elm

The first two species have proven much the hardiest; the mortality rate on the other species has been excessively high.

The University of Alberta was consulted about a grass seed mixture and, on their advice, the following mix has been successfully used for the past 18 years:

- bromé
- crested wheat grass
- alsike
- clover

Photographs of the restored area appear as Illustration B.

Approximately 98% of the land surface at Forestburg is owned by the company. The balance is accounted for by road allowances leased from the local municipality.

As an indication of the effectiveness of the reclamation work at the Forestburg mine, local farmers lease 676 acres of the seeded

area as pasture. Also, we are told that more game (birds and deer) is now to be found on the reclaimed land than was in the area prior to mining and reclamation.

VI SURFACE MINING IN THE MOUNTAIN REGION

The mining operation of Cardinal River Coals Ltd. at Luscar, Alberta (25 miles south of Hinton) provides an example of a surface mine in the mountain region of Alberta.

The history of this mining property warrants brief mention. Luscar developed the property in 1921 as an underground mine. Surface mining, using the small scale equipment then available, was added in the late 1940's to supplement underground production. In 1956, loss of markets forced the complete closure of the mine. Coal production to 1956 totalled approximately 15,000,000 tons, about 75% of which came from the underground workings. Following closure, the site was cleared at the company's expense; no derelict buildings were left to clutter up the landscape.

In 1968, Luscar and Consolidation Coal Company of Canada (the Canadian subsidiary of the second largest coal producer in the United States) formed a joint venture to reopen the mine as an open-pit operation. A contract for 1,000,000 long tons per year was negotiated with the Japanese. Many millions of dollars were invested in exploration and development, mining equipment, a complex coal preparation plant, other mine facilities, and railway equipment. The existing rail line into the property was upgraded at the expense (ultimately) of the company. Shipments of clean coking coal to Japan began in the Spring of 1970. Since then, the mine has succeeded in meeting its contract commitments with respect to both quantity and quality of coal.

To illustrate the nature of the mining operation, Illustration C is a cross section through a portion of the property showing two of the several pits which will temporarily be opened in the process of recovering coal, and then backfilled. Excavation of the first such pit will soon be completed. Overburden (consisting mainly of blasted sandstone, with a small proportion of shale) removed from what is shown as the second pit will be used to backfill the first pit, and this process will be repeated from pit to pit as mining progresses.

It is important to note that the nature of the surface mining operation at Cardinal River differs markedly from the so-called "mountain" or "contour" strip mining practiced in hilly areas of the eastern U.S. and illustrated by Illustration D. With that type of mining, problems have been encountered with spoil material pushed or dumped loosely over the sidehill; such material tends to slip, causing damage below, and this has given rise to a need for control and regulation. It should be apparent that regulations developed for such a situation are by no means applicable to the mountain conditions of Alberta and it would be a mistake to assume that they are applicable.

It is clear that there are two distinct aspects to the planning of mining operations in the mountain region of Alberta:

1. Planning physical operations to achieve suitable topography.

Note that most of the pits will be backfilled to approximately their original contour. This phase of mining plans is already completely controlled by the provincial government authorities.

2. Planning for Revegetation.

Information as to what is actually practical in the way of revegetation in the mountain region, at elevations of 5,000 to 7,000 feet, is still scanty. More research will be needed before anyone will be in a position to formulate practical revegetation regulations. In the meantime, Cardinal River is co-operating closely with the Forest Research Laboratory of the Canadian Forestry Service, which is carrying out studies on the mine property; initial findings of this research activity were contained in a preliminary report issued recently.

The first opportunity for large scale planting occurred this past Fall, when 50 acres were prepared, fertilized and planted with the following:

- fescue
- clover
- kentucky blue grass
- alfalfa
- flower seeds in meadow area
- tree seeds from Montana
- tree seeds picked locally.

The effect on water courses in the mining area is a major consideration in the planning process. We would like to recommend that more flexibility in the matter of diversion of minor water courses be permitted than has been allowed to date. At Cardinal River, the first pit intersects a minor creek. Permission was sought to divert the creek away from the pit, and let it flow into Luscar River rather than the Gregg River. Permission was denied, on the grounds that the authorities are opposed in principle to

any modification of water flow. As a consequence, the mine experienced serious operating problems last June, when approximately eight inches of rain fell during the month. The problem would have been manageable had we been allowed to divert the small creek. It can be expected that similar situations will be encountered in future.

A problem we are currently facing will illustrate the difficulties of both developing workable groundrules for surface mining operations in the mountains and endeavouring to maintain production before such groundrules have been formulated. In the course of opening the first pit at Cardinal River during the period from the Spring of 1969 to the Spring of 1971, part of the overburden removed was deposited on a planned overburden dump adjacent to the Gregg River. We now understand that the authorities are dissatisfied with the result, and indications are that the mine may be obliged to change the configuration of the dump. This will involve removing as much as 500,000 cubic yards of material, which will not only be very costly but will interrupt production operations and make it difficult to meet our delivery commitments. Before undertaking any such work, we will have to know what will be acceptable to the authorities; as yet, however, there are no definitive regulations specifying such matters as the maximum average slope of such overburden dumps, nor has it been decided whether a terraced profile will be acceptable (the company's mining engineers believe a terraced profile would in the long run prove more satisfactory than a continuous slope.)

VII EXPLORATION FOR COAL

Before a new mine can be brought into production, the mining company must undertake exploration work to determine:

- the existence of a coal deposit
- the quantity of coal
- the quality of coal
- the structure of the coal deposit
- the nature of the overburden
- mining conditions generally

In the foothills and mountains regions, this exploration process usually involves the following:

1. Initially, a reconnaissance on foot supplemented by aerial reconnaissance and interpretation of aerial photographs.
2. As the next step, we have lately been testing the use of portable electronic equipment (induced potential method) which involves no appreciable surface disturbance.
3. Sooner or later, we have to go onto the property with drilling equipment; we have both truck-mounted and crawler (Nodwell) mounted drilling equipment.
4. While relatively small samples can be obtained by core drilling, we normally need larger samples ('bulk samples') for purposes of designing the wash plant and for examination by prospective customers; such samples are obtained by opening small test pits on the property.

Normally in the foothills and mountain regions, such exploration activity is carried out on public lands. We doubt that it is generally realized how very tightly such exploration activities are already controlled by the government; for example:

- We must obtain advance approval before cutting lines, or undertaking geophysical exploration, drilling or test pit activities; this involves submitting plans and a description of the proposed work.
- We must obtain advance approval before entering onto existing cutlines with equipment.
- We are required to clear slash from cutlines (100% disposal 300 yards back from roads) and we are required to seed and fertilize the entire length of a new line.
- We are required to re-seed and fertilize existing cutlines traversed by our equipment.
- We pay a fee for using existing cutlines.
- We are required to pay for timber cut in the process of cutting lines.
- Any drill holes from which water flows must be reported and plugged.
- Upon completion of an exploration program, a complete report must be submitted to the Director of Minerals and the Director of Forests.

These regulations are closely enforced by the government departments involved.

It is difficult to imagine how the exploration activities of the industry could be more closely regulated, or where it might be contended that there is any need for tighter control or enforcement.

We believe that the present requirement regarding how quickly test pits must be backfilled is unrealistic and works a pointless inconvenience on the industry. Normally there is a legitimate need to obtain samples, for customers and for plant-design purposes, from a test pit over a period of up to two or even three years. However, at present we are under pressure to backfill test pits quickly after opening them up. We submit that such premature closure is unnecessary and unrealistic, and we would like to suggest that more latitude be permitted in this matter.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

It has been particularly helpful to have your submission since your company has experience in the three major areas in which coal is mined in the province, the prairies and the foothills and mountains. On the basis of this experience, do you feel it would be an advantage if legislation and regulation were drawn up separately for these three areas?

MR. GEORGE COATES

I wouldn't care to say about the legislation, legislation is usually so broad. Certainly the regulations have to be entirely different for each of the three zones and I quite agree with others in industry who say, "Let us not fall into the trap of attempting too detailed regulations." In the mountains, for example, our knowledge of the revegetation process is simply too scant at this time to know with any real certainty what the requirements should be. We are cooperating in research. This fall we have done our first large-scale planting of some 50 acres using flower seeds, grass seeds and tree seeds. Industry, government and science have to feel their way in that particular area.

DR. WALTER TROST

The value of the coal in dollars per ton increases from the plains to the mountains and it may be that the reclamation costs are also different in the three areas. Could you say something about that?

MR. GEORGE COATES

Yes. It seems to me that in the mountains in particular, reclamation is not so much a separate operation as an integral part of the planning and the conducting of a mining operation. This is why we feel that there are two phases to the planning: first, to plan the final contour and make sure that mining operations are conducted in such a way as to achieve that final contour without needless and costly alterations. It is most important to know that final contour before starting. Second, to plan revegetation as a separate operation.

Again the nature of the operations are so different. In the mountains we are opening up a vast pit, removing the coal, then back-filling that pit to its original contour and moving on to the next pit using the overburden from the second pit to backfill the first pit and carrying this process on sequentially. Mining in the plains is a continuous process. We are using a large shovel which could be a drag line picking up the overburden and putting it into the trench cut by the last pass.

DR. WALTER TROST

The question is the impact on the marketability from an economic'competitive view point of surface reclamation costs in the three areas, bearing in mind that in the plains the cost would reflect on a utility. Is the major difficulty in surface reclamation the procedures themselves which in some cases are extra difficult and may need extra manpower and are therefore a management difficulty, or is it the cost which may be different in the mountains and foothills? You may have open-ended contracts in the prairies where you may not in the mountains. Can you answer that?

MR. GEORGE COATES

I am not entirely sure I am zeroing in on what you have in mind but associated with any standard of reclamation there is a cost. Even the slightest reclamation activity, short of walking away from the property, does involve cost. We make no attempt to impose the value judgement of how much cost, but, we are trying to point out that there is an effect here. Any increase in cost is going to have an adverse affect on our ability to market this potential resource and turn it into a resource of real value for the benefit of all in the province.

DR. WALTER TROST

There has been so much talk about cost-benefit analysis and its advantages, but that is a practical approach only if you can analyze the sources of these costs and make judgements on that basis. I am trying to find out if it is practical and possible, to analyze these costs and estimate their magnitude.

MR. GEORGE COATES

Yes, I would say it is possible to analyze the costs of reclamation in particular, provided the standard is defined. I think you have probably seen Enders' report where he had done a very interesting survey of the costs of reclamation. He takes those costs up a few hundred dollars an acre to six thousand dollars an acre depending on the end use of the property and the standard that was established.

DR. WALTER TROST

When you talk about a reasonable time interval, which will vary in the three terrains no doubt, can you tell us what this might be?

MR. GEORGE COATES

Here we definitely have to distinguish between the mountains and the plains. On

the plains it is more practical to think in terms of the function of distance. We can't operate on the spoil pile that has been created. There is a two-phase reclamation operation; we move in and take the top off the spoil pile. We do not come to a completely flat contour, as we have found, and the authorities agree, it is less satisfactory than leaving a gently undulating contour. Then we have to plant. The seasonal factors come into this of course. With several feet of frost it is prohibitively expensive. We can only seed in the appropriate season. We would suggest a useful rule might be that the operator be allowed to leave three spoil piles behind the area in which he is operating. In other words a narrow band between the pit that is actually being opened and the reclaimed, reseeded area.

DR. WALTER TROST

In the mountains it is difficult to be as specific as that?

MR. GEORGE COATES

Yes, let me give you an example. We are opening up the first of several pits. The first pit contains in the order of two million tons of coal. We are getting down close to the bottom of that pit and we are just starting now to backfill it at one end. We can't think in terms of reclaiming the final surface until we get there. We must go all the way down several hundred feet, remove the overburden in coal, backfill and come back up several hundred feet. So here is the folly of a hard-and-fast time, "You must refill that pit within a year." Well, within a year we are only half way down to recover the coal.

DR. WALTER TROST

You mentioned that the economic benefits in Alberta, presumably from the operations of the coal industry, are greater than generally supposed.

MR. GEORGE COATES

I think that we must take into account not only direct employment at the mine but we must also remember indirect employment; the suppliers of materials and services. I am sure the town of Hinton, for example, has had a tremendous economic stimulus from our operations. Our people are housed there. They use the local services. We are operating two unit trains in a continual shuttle service between our mine and deep water in Vancouver. We have become about the largest user of C.N.R. services in Western Canada; a very important source of revenue to the railway and all that goes with it: equipment, rolling stock, power units, track gangs, operating crews, etc. The bulk terminal operation is outside of Alberta but this certainly comes into it. We have invested many millions of dollars on equipment, construction of mine facilities, highways and railways into the area. We use large quantities of power. We pay taxes to the municipal and provincial authorities. We pay lease rentals and royalties to the provincial

government and to individuals, indeed to some of the beneficiaries of the original prospectors in that mountain area. The industry and our company sponsors research and development projects. The list could be expanded. I think this will illustrate that there is a lot more to it than simply direct employment or royalties.

MR. PAUL BABEY

Mr. Coates, I gathered from your remarks that you felt that comprehensive environmental planning prior to issuing the permit or the lease was not practical. Could you suggest other methods, particularly in an area that has some potentially valuable coal, and where reclamation and revegetation might create quite a problem.

MR. GEORGE COATES

The first problem is to establish that there is indeed an economically recoverable deposit. Until we do that we are tilting at windmills. I would say that in the exploration stage, the need is to have regulations which minimize the environmental disturbance in the course of exploration. I submit that we are already regulated to the point where we have to do a one hundred percent clear-up of slash on cut-lines. We have to re-seed and fertilize cutlines out from the wilderness. So the mechanics are there for minimizing surface disturbance during the course of the exploration operation. We have to find out what is there. Is it economic? What is the likely scale of operation? This has quite a bearing on this comprehensive environmental planning of which we are speaking. Let's find out about the deposit and then, as a condition of commencing mining operations, let us do the comprehensive job you are referring to.

DR. WALTER TROST

You objected to expropriation of mining rights and to the restriction to a company in certain sites for esthetic or other reasons in the position paper. We have had many submissions about the undesirability of surface disturbances immediately juxtaposed to, Kakwa Falls in the Grande Prairie area, or the National Parks, or other places of great beauty. Would you care to elaborate on the reasons for your opposition to restrictions to surface mining in locations of that sort?

MR. GEORGE COATES

I think underlying the suggestion that the government would have to resort to expropriation, there is an assumption that the industry would not or could not reclaim land satisfactorily. This is, in our view, an erroneous assumption. It is a question of establishing the standards. Conceivably we have the technology to meet any standard.

Whether we can do so economically is another matter. I am saying, let there be set standards, let them be varying, in an area of high recreational potential a particularly high standard, but if that standard can be met the industry should be allowed to proceed.

DR. WALTER TROST

So you are suggesting, taking a hypothetical case, if there were beautiful falls and underneath a good bed of coal, the coal mining would temporarily interrupt the falls. That situation might be met by a statement of standards, rather than by exclusion from mining.

MR. GEORGE COATES

Yes it is.

DR. STUART SMITH

Mr. Coates, you have emphasized economic aspects throughout your brief. On the prairies, the kinds of coal that are being extracted are used for thermal generation and the cost, as Mr. Stanley says, is passed on to the consumers of electric energy within Alberta. Would you then say that the environmental protection cost should be passed on to the Japanese consumers if the coal is being exported?

MR. GEORGE COATES

Perhaps, in the first place I think we would all acknowledge that, to the extent that the reclamation standards are tightened up, more cost will be involved and something has to become of that cost. I submit there are just three consequences of increased cost through reclamation. In the first place as with any cost increase, a producer (our industry or any other industry) is going to endeavor to pass that cost increase on to his customer, to the extent that it is feasible for him to do so and still remain economic. Therein lies the rub. The second possibility: Much of our coal and the coal produced by our industry is sold under long-term contract for the protection of both buyer and seller. Sometimes these contracts provide for certain cost increases or a portion of them to be passed on to the customer on a pre-arranged formula. Very often they do not allow for all cost increases to be passed on. To the extent that is true, the producer is faced with a 15 year commitment to supply coal and increased costs which he has to absorb. The third effect of increased costs is that it detracts from the marketability of our coals. Returning to the extremely competitive situation that our coals, whether coking or thermal face we thus make our coal less competitive and put off the day when we can hopefully break into additional markets. One of those three consequences will result from increased reclamation costs.

DR. STUART SMITH

Has Luscar & Cardinal River Co. Ltd. anticipated fixed costs in reclamation? Did you allow for this over a 15 year period in originally opening the property at Luscar?

MR. GEORGE COATES

As prudent people we have allowed for costs we could foresee. It is very difficult to allow for costs you cannot foresee and this is really one of our major concerns. We are committed to a long-term contract and you would be surprised how a seemingly innocuous regulation can have very, very drastic cost consequences for us. In a slope on an over-burden dump, if that slope was flattened out, we must carry that material that much further which means additional cost and more equipment because we are not geared up to do that particular operation. So in answer to your question, we naturally have anticipated costs as fully as we could foresee them.

3.5

STOP (SAVE TOMORROW OPPOSE POLLUTION)

PRESENTED BY MS. KAREN MOLGAARD

STRIP MINING IN ALBERTA

Some of the damage that our environment is being subjected to is truly difficult to prevent because of jurisdictional problems. Among those difficult to solve is the poisoning of the oceans by pesticides, defoliants and oil spills. We must stop killing the oceans but this is a major problem to overcome because every nation is involved. Today we are discussing an environmental problem that should be simple to solve, the strip mining problem in Alberta. It is relatively simple in that there is only one industry to deal with, the coal mining industry, and only one level of government to deal with, the Alberta Government. It then should be a relatively easy environmental problem to overcome administratively but it has not been easy. It has been extremely difficult. If this problem cannot be solved when it should be so simple, we have very little hope of solving our more complex environmental problems. In August of 1971 Albertans discarded an old government and elected a new one. One of the main reasons for the defeat of the former government was its intransigent and carelessness in dealing with the environment. Nowhere was this more obvious than in the area of strip mining of coal. Our new government has inherited a set of laws dealing with coal as well as a civil service to administer these laws. We recognize that the present elected government of Alberta has not had time to make changes in this area and we most emphatically are not criticizing them. We applaud the decision to hold a public hearing on the environmental impact of strip mining in Alberta. Our criticism is directed only against the deplorable situation surrounding strip mining that our present elected representatives

inherited. We recommend: (1) A change in the philosophy that places conservation ahead of exploitation and (2) A change in the antiquated laws that allow cavalier mining practices. First I would like to show some slides that illustrate the problems resulting from strip mining of coal. This will be a bit later. Strip mines can destroy land, soil, water supply and recreation potential. We are fortunate today in Alberta because we have not had, as yet, much strip mining. We are in a position to avoid the catastrophic mistakes that have been made in other places, most notably in the eastern United States. Certain states in the eastern U.S. have sensible and effective laws governing strip mining. Unfortunately however they had to go through environmental crises before the mining men would allow the politicians to pass these laws. Kentucky now has a law that should be followed by Alberta as a model. The environmental damage from strip mining in Kentucky reached crisis proportions after many years of uncontrolled mining. This state has now largely solved the problem with current mines but only a tremendously difficult battle with politicians and industry. The situation was so bad that strip mining was the key issue in the state election. In 1966 a courageous man was elected governor. His main platform was proper control of strip mining. Control has been effective there and it has not hampered the mining industry. We would like to emphasize that last point. Two entirely different kinds of mining were done in Kentucky, respectively in the plains and in the mountains. The same situation applies in Alberta where we have both the plains and mountain coal. First of all I would like to discuss and show slides on the situation on the plains. This aerial photograph shows a shovel in Kentucky that is capable of scooping up 65 cubic yards of rock at a time and is used to uncover the coal. The two trucks which you can see at the base of the cabin are very tiny in comparison

they could drive into its shovel and could be lifted along with a dozen or so others. This machine is capable of drastically modifying the landscape in our environment. More machines are now being used here in Western Canada and some of the companies with deplorable records in the United States are operating here. For 20 years strip mining went on in Kentucky with reckless abandon and it left spoil piles in long strips throughout the countryside. The next slide please. These spoil piles being unstable grew almost nothing and eroded rapidly damaging the streams with silt and acid water. Scenes like this are also common on the Alberta plains though on a much smaller scale. Under Kentucky's new law the plains operations are now controlled successfully by a forestry department which requires two simple techniques. The next slide please. First of all a bulldozer follows behind the big shovels and levels the ridges of over-burden as they are piled up. The next slide please. A hydro-seeder then sprays the mixture of grass seed, fertilizer, asphalt and water on the area. The asphalt sticks the mixture to the rock. Next slide please. The grass grows quite easily. At present strip mines are being turned into recreational areas and some are used for pheasant hunting. Next slide please. Strip mining in the plains of Alberta offers no serious technical problems, only administrative problems. Mining was done carelessly here because the Surface Reclamation Council allowed this to be done carelessly. Next slide please. This slide is taken at Forestburg which was the Luscar operation mine site which Mr. Coates spoke so highly of. The competence of the Surface Reclamation Council must be greatly raised. The Calgary Power strip mining operation at Wabamum west of Edmonton operated for years without much thought to the environment and developed into a real mess. When the public became alarmed about strip mining, this company, to its credit, began to employ proper practices.

When their present long-term plans are completed, the area will be left in quite an acceptable condition. The present very bad situation there is a result of extremely poor planning. This poor planning should not be repeated. Moving to the mountains it is much more difficult to protect the environment. However a simple technique was developed in Kentucky and is effective. It is called the slope reduction technique and should be employed in Western Canada. Next slide please. The slope reduction technique is simply to remove the trees in advance and smooth out the over-burden so that it is not at an unstable angle. The over-burden is then sprayed by a hydro-seeder with a fertilizer and seed mixture and the result if often a hiking path and recreational areas. Next slide please. Even with these techniques not all problems can be solved and in certain areas of Kentucky strip mining is not allowed. The coal companies in Kentucky fought the new law bitterly as did their political arm, the mining department. They claimed that the damage was negligible, the new law was unnecessary and that it would drive them out of business. This is precisely what is done and said by the mining industry in Alberta and British Columbia. The fact was in Kentucky however that coal production increased by 7% in the year following introduction of the new law. The cost of proper reclamation did not harm the industry being only about 2¢ per ton of coal mined. It could be done simply if it was planned in advance whereas it usually could not be done at all if left until later. It is ironic that the coal companies here are playing Alberta and British Columbia off against each other. The two provinces have competed against each other to encourage new mines by offering the companies better deals like building roads or railways for them. In the same sense the Japanese coal importers are playing off Canada and Australia against each other by threatening to import from the other country. Meanwhile the environment,

and future generations, suffer. Looking at mountain strip mining, Canadian style (could I have the next slide please), Grassy Mountain near Blairmore in the Crowsnest Pass of Alberta was strip mined by a French company called Western Canadian Collieries and abandoned in the 1950s. They cut a gouge up the hillside, cut roads back and forth and dumped overburden and slag coal down the hillside. The company that created this mess is no longer in the coal business in Western Canada and has sold its assets to another that is considering reworking this mine. Another strip mine in the Crowsnest Pass is the Adanac Mine, also operated by Western Canadian Collieries. Next slide please. This mine was operated with total disregard for the environment. A photograph taken in 1960, about nine years after abandonment shows no significant vegetation. Could I have the next slide please. Another photograph taken still 11 years later in 1971 shows no significant change, since 1952 when it was abandoned to 1971. From the point of view of the present inhabitants of Alberta, the damage from these strip mines is permanent. The Adanac Mine has been like this for nearly 20 years causing serious harm to our watersheds and creating a blight on the landscape. This mine is just a pimple to what the companies now propose to do along the foothills belt. They must not be allowed to repeat these mistakes on a massive scale. A practice that has been common up to now in mining in Alberta has been to use slag coal to build access roads. Next slide please. It can be seen that the part of the road constructed of coal does not revegetate. The photograph was taken in the Panther River area west of Calgary and the work was done by Mitsubishi Corporation in 1967 on C.P.R. property. The photos shown so far are of abandoned mines operated in the 50s and 60s but now we are in 1971 and things should be different. I despair to say that mining practices have improved on the plains and do not there oppose such a

serious threat to the environment but they have not changed much in the mountains except to become hugely bigger. It is about the mountains that environmentalists are worried. Next slide please. In May of 1969 the Kaiser strip mine at Mikel, B.C. was being prepared. The area was being cleared and roadways were being built. The slope reduction was not being used in road construction and apparently now is not being used with overburden. Next slide. In the roadways shown the over-burden was simply pushed down the hillside on to trees and snow and left at an unstable angle. In the spring thaw and for many years to come caving and slippage of these piles will put great amounts of material into the streams. Since these photos were taken Kaiser has gone into production and is mining actively. They have had great operational difficulties and in efforts to stall them have had little time or enthusiasm for protecting the environment. Kaiser does not yet operate mines in Alberta but is typical of major companies which do. Kaiser gave a \$5,000.00 scholarship to U.B.C. for its students to study revegetation of strip mine and thereafter spent a great deal more money advertising this fact. It should be pointed out that this scholarship is worth approximately the same as a single tire on one of their big trucks. The coal mining boom has indeed brought prosperity to the Fernie area but it is damaging the recreational potential and water supply more than necessary. In the long run these environmental damages may outweigh the benefits of the present mining boom to the people of British Columbia. They will certainly persist after the mining companies have moved on. Next slide please. Numerous companies have plans for coal mines in the mountains of Alberta and are now doing extensive exploration. Often this exploration is as damaging as the mine. Caterpillars are used to cut trenches up and down the mountains, the over-burden is allowed to fall down the hillside. Attempts are sometimes

made to fill in the scars but it is generally recognized this cannot be done without some sort of dragline. Next slide please. Above timberline nature heals her scars slowly and these scars will persist for many generations. Much knowledge is available on how to minimize the harm of mountain strip mining. We must begin to apply it here in Western Canada. There are only two groups to deal with in Alberta, the companies which do the mining and the provincial government which controls it. In Alberta certain companies have indicated that they want to be reasonable and will accept firm guidelines if they are clear. Two things are absolutely essential to control strip mining properly. In Alberta neither is now the case. First the control of reclamation must not be left in the hands of the Department of Mines and Minerals because that department has no real interest in reclamation. Its interest is in increasing mineral production and it naturally allows companies to do excessive environmental damage in order to increase that mineral production. Therefore we must remove the control from the department and put it in the hands of a government department that has some interest in conservation. Secondly companies must be required to submit for approval prior to mining complete reclamation plans. Alberta has certain antiquated laws particularly in the Right of Entry Arbitration Act which is the real bane of conservationists. It is an act under the Department of Mines and Minerals by means of which a mining or oil company can have the conservation regulations of the Department of Lands and Forests over-ruled. This law should be eliminated immediately. It is time to analyse carefully how strip mining fits into the future we want for the citizens of Alberta. Probably strip mining should be banned in the mountains altogether. Unfortunately these hearings have not been empowered to even discuss that possibility for it was stated in the prospectus that strip mining will continue to increase in Alberta. Environ-

mentalists have been told that strip mining will increase and we accept that. We have been forced to compromise. We ask then that the exploiters compromise with us. First we ask you to pause and not rush headlong into exploitation and exploration in the entire mountain belt. Let us separate the coal bearing areas of the mountainous belt into two categories of equal size. Mining areas and reserve areas where coal mining is banned for 15 years. Mining could take place in the first type and in fact increase. These would be the areas where it already takes place, the accessible areas in and near the mountain passes where there are already rail lines and towns that are dependent on mining. Between the mining areas would be the less accessible areas that are now unspoiled and that would be set aside as temporary reserves. At the end of 15 years we would be able to appraise the effects of these huge mines on the environment and then be able to make intelligent decisions on what to do with the reserve areas. If we indeed have the vast reserve of coal that is claimed then on-half of our mountainous area should quite adequately satisfy the demand of the next 15 years. Secondly let us establish some proper laws that will protect our environment in those areas where mining is allowed. I won't go into detail on the legislation regarding the protection of the environment but it definitely should include such things as a plan which is established for reclamation before the strip mining operation begins, should also include the posting of a performance bond by strip mining companies which will cover the cost of reclamation either by themselves or, if they choose to forfeit this performance bond, then the cost would be covered for a contractor to do the reclamation. It should also include a clause whereby, if a company forfeits its performance bond, it should not be granted a further lease. I would just like to say that this brief was prepared by Dr. J.W. Kerr, professional geologist in Calgary for presentation by S.T.O.P. at this hearing.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

I would like to commend you on the photographs. Did you take them?

MRS. KAREN MOLGAARD

They were taken by Dr. Kerr and friends.

DR. WALTER TROST

Your basic submission is not to oppose strip mining in its totality but to urge proper regulations and suitable reclamation. Is that right?

MRS. KAREN MOLGAARD

Yes, I believe from the prospectus put out by the Environment Conservation Authority, that was the only area that would be considered. I would not be in a discussion on whether we were for or against strip mining in the mountains.

3.6 .

A Brief Presented By Mr. A. James

Ladies and Gentlemen:

I thank you for the opportunity to submit my comments on the protection of the existing environment of alpine and sub-alpine areas. My comments will be limited to non-renewable resources, of which I feel strip mining and underground mining are a part.

The area with which I am most familiar is the Coal Branch, but I am appalled by the devastation wrought by both types of mining which have been carried on in the past twenty years in most of the foothill regions.

Some people say that large portions of the Branch, which have been and are now being exploited, should keep the so-called "Energy People" happy for some time. The popular thinking of jobs created at the expense of resources must be carefully examined. The practice of todays mining upholds this thought. Reclamation claims have not been substantiated. No real effort has been made in this fragile area to establish a viable system to arrive at reclamation costs. Therefore, what is a ton of coal really worth?

It may be selfish thinking to say the Coal Branch water goes to the arctic, and so will not pollute our areas of heavy population. With this in mind I wondered if it is too late to speak for a relatively small area which lies south of the Cardinal Divide and represents the northwestern start of our Saskatchewan River watershed.

I feel that serious consideration should be given to stalling surveying of non-renewable resources in this area, and would now ask consideration to let the recreation industry compete with the mining industry in the area described as follows:

- Bounded by: (a) the Cardinal River Divide on the north as it stretches to the Brazeau River.
- (b) Jasper Park boundary on the southwest.
- (c) the Brazeau River on the southeast.

I submit a copy of access map #83 F/C,* with the described area outlined in red.

This area is relatively untouched and gives opportunity for excellent recreational activity for all citizens.

If dollars and cents are important at this moment, let us take the long view and be money ahead. We must consider the impact of recreation spending. Future generations will give us a lot more credit for this suggested stand.

Thank you for your time.

AL JAMES

* This map is not published with these proceedings, but is available in the Information Centre of the Environment Conservation Authority.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

Mr. James, I assume that you are personally acquainted with this area that you are suggesting for a park, is that right?

MR. AL JAMES

Yes. For the past ten years we have done quite a bit of back packing, fishing, and other recreation in that area.

DR. WALTER TROST

Is there much guide work or hunting in the area?

MR. AL JAMES

Yes. It is a very popular place for outfitters. I don't want to stick up for those people, but I just would like to see that people who follow us won't be deprived of the thing that we have enjoyed.

DR. WALTER TROST

I understand, from your description of the boundaries, that it would be an extension of the Jasper Park to the northwest. Is that right?

MR. AL JAMES

That's quite correct. The water runs from that point to the Arctic and from the other side right through the prairies.

DR. WALTER TROST

Your suggestion is that it be operated under the restriction that national parks are operated?

MR. AL JAMES

I have given it some thought, I think if we are going to save it, it requires very careful consideration. If it's going to be a park area maybe that's what it should be.

THE ALPINE CLUB OF CANADA

Canada's National Mountaineering Club

COMMENTS ON THE ENVIRONMENT IMPACT OF SURFACE MINING IN ALBERTA

Offered to

THE ENVIRONMENT CONSERVATION AUTHORITY

by

THE EDMONTON SECTION OF THE ALPINE CLUB OF CANADA

Jo Ann Creore, Chairman, Edmonton Section

H. W. Habgood, Chairman, Conservation Committee, Alpine Club
of Canada

INTRODUCTION

The Alpine Club of Canada is Canada's national mountaineering club with a history of over 60 years and a current membership of about 1500 plus some 1000 section associates. Its objectives include "the encouragement and practice of mountaineering...", "the education of Canadians in the appreciation of their mountain heritage", and "the preservation of the natural beauties of the mountain places and of the fauna and flora in their habitat". The Edmonton Section of the ACC engages in year-round climbing and skiing activities in the mountain regions of Alberta. As citizens we are concerned with all aspects of conservation and resource development in the province. As a climbing organization we wish to direct our brief today to the problems of surface mining in the mountains and foothills. Specifically, we wish to emphasize the underlying philosophy of legislation relating to surface mining and the environmental safeguards we believe must be built into such legislation.

ENVIRONMENTAL CONTEXT

Although we do not propose to comment on the technical aspects of reclamation, our recommendations arise from consideration of the environmental context in which strip mining will take place. To our knowledge, no successful procedures have been developed or tested for reclamation of land in the altitude, latitude or climatic zone of the Alberta foothills. Methods applied in the Eastern United States or Western Europe are not necessarily applicable to Alberta because of differences in climate, nature of the soils, geologic deposits and bedrock geology. In the absence of evidence to the contrary, we assume the possibility that in some areas even minimal revegetation could not be achieved in the foreseeable future. Even if possible, reclamation in the foothills may be prohibitively expensive. Legislation must provide a mechanism for deciding whether or not to mine a given area in which there is a high likelihood of irreparable damage.

The effects of strip mining go well beyond the locality in which it occurs. Silting of streams or contamination by chemical or physical agents are obvious examples of pollution which must be controlled. Less measurable is the aesthetic damage, but equally important to a citizenry which looks increasingly to its wilderness areas for beauty and respite from modern technology. The public has a collective interest in minimizing the destruction of such areas. Only the public can exercise enough pressure to counter the economic arguments in favor of mining. Whatever the mechanism for approval of mining operations, it should provide for informing the public fully, and in advance, of the consequences of these operations.

Where mining is proposed in relatively inaccessible areas, one can argue that the public suffers very little even from permanent damage to the environment. We consider this a short-sighted argument. With a growing population and increasing demands for recreational lands as well as wilderness preserves, it is doubtful that any area can safely be dismissed as "inaccessible" or "unimportant". The effects of strip mining must be calculated for future generations, not just for our own.

We recognize, however, the economic benefits of surface mining to the province. Our position is that such mining must be regulated so as to minimize the harm it can do and so obviously has done in other areas. Permanent alteration of the environment need not be equated with permanent destruction. In areas where total reclamation to the original state is not feasible, alternate uses of the land should be considered. Recreational uses are particularly attractive; for example, the creation of small lakes in the relatively dry foothills, of snowmobile or hunting areas, or even, where precipitation levels permit, of modest ski developments. Such uses should be planned before mining begins so that the total operations will facilitate ultimate reclamation.

Although the environmental impact of surface mining has been well publicized, less attention has been given to the effects of exploration on the land. In mountainous regions a single bulldozer track up a hillside can leave a scar that erodes and may take years to heal. Furthermore, at the present time exploration takes place throughout the whole extent of the eastern slopes of the mountains and cumulatively is perhaps a greater violation of the wilderness than would be a limited number of controlled strip mining operations. We wonder whether a large measure of the undesirable effects of exploration are merely the result of using readily available, large-scale, heavy equipment. Could the same results be obtained at little extra cost with smaller drills and shovels and travel by pack horse or helicopter? If this is the case, use of less damaging methods should be required by legislation.

RECOMMENDATIONS

In the light of these considerations, we make the following recommendations:

1. All aspects of surface mining, from initial exploration to completion of reclamation should be governed by effective legislation.
2. Before a permit to mine is granted, an acceptable reclamation plan should be agreed upon.

This reclamation plan need not necessarily propose returning the land to its original condition. The plan may include alternate recreational uses, or development of a water storage reservoir, for example.

3. The probable environmental impact of a proposed mining operation should be assessed by an independent agency.

The position statement of the Environmental Conservation Authority (November 26, 1971) suggests that the resource user should provide this assessment. An unbiased opinion is more likely to be obtained from an agency which has no financial interest in the proposed mine. The resource user should be required to prove that proper reclamation procedures can and will be carried out. Only upon receipt of the independent assessment and of proof from the resource user that reclamation is possible should a mining permit be issued.

4. Unique features of the environment which cannot be recreated or replaced should not be mined.

This principle is observed in the national parks and should be observed on provincial lands. Admittedly it is difficult to assess the uniqueness of a feature or to weigh its value against the immediate economic benefits derived from mining. But unless some program of protection is instituted we rob future generations of the opportunity to choose. At the very least, mining of unique areas should be deferred until less valuable areas have been worked. And, of course, it is only fair to the companies involved that possible restrictions or deferrals should be made known to them before they undertake any exploration program rather than at a later time when they may have already invested significant amounts of money.

The ECA position statement proposes financial compensation by resource users for destroyed features. Clearly it is the impossibility of placing a monetary tag on these features which creates the problem in the first place. Financial compensation in this regard makes sense only if it is substantial enough to serve as a deterrent.

5. Public hearings should be required on all proposals which involve permanent damage or fundamental alteration of the environment.
6. All surface mining operations, regardless of size, should be regulated.

A small operation continued over a period of years can create widespread cumulative damage. It may well be that reclamation in the foothills will prove prohibitively expensive for small companies. In this case, such companies should be directed to less fragile areas where reclamation will be within their means. We urge that no mining be permitted without reclamation.

7. The government should positively encourage the development of reclamation methods for mountainous regions.

The economic benefits of resource development are so great that strip mining operations will burgeon in the coming years. The province of Alberta will profit from this development, just as it will suffer from any environmental damage that results. We agree with the general policy that "the polluter must pay" and hold that mining companies should pay for reclamation. However, so little is known about reclamation under Alberta conditions that an intensive program of research should be instituted immediately. It is proper and probably necessary that the government contribute to this.

Finally, we would like to thank the ECA for the opportunity to present this brief. Public hearings such as this one are a positive step in the direction of wise resource management.

Respectfully submitted,

Jo Ann Creore

Jo Ann Creore, Chairman, Edmonton Section.

H. W. Habgood

H. W. Habgood, Chairman, Conservation
Committed, Alpine Club of Canada

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

If your first recommendation, you emphasized the phrase "effective legislation" and there was discussion this morning on the contrast between flexibility and regulation in standards to be achieved, and preplanning and site selection. Do you have any choice between these alternate ways?

MRS. JO ANN CREORE

I think that very much depends upon the nature of the environmental problems of the region. I think by "effective legislation" we would emphasize that it prevent any mining without reclamation but would not necessarily lay down such rigid guidelines that the companies have no flexibility to suit their reclamation timetable and methods to the region involved.

DR. WALTER TROST

So you emphasize more the result that is produced?

MRS. JO ANN CREORE

That's right.

DR. WALTER TROST

In more than one of your recommendations you made reference to the desirability of protecting particular sites, strictly because of the virtues they may possess. Do you want to elaborate on that?

MRS. JO ANN CREORE

I think one of the problems we face with the Alberta foothills is that they have not been sufficiently explored to appreciate some of the unique features of this area. This is one of the reasons we would emphasize public hearings. The uniqueness of an area could be determined by any number of factors. Lands which are not currently covered by any of the national parks: the dry eastern foothills or the mountains, for example, are not represented in our national parks in the west. Wildlife considerations, habitat of rare and endangered species, prime recreation areas, all of these could be considered.

DR. WALTER TROST

It seems to me the nature of the activities of the Alpine Club bear somewhat on your submission. Would you describe, for the benefit of the audience and myself, the basis of membership and the kind of activities that your club encourages?

MRS. JO ANN CREORE

The club encourages a wide range of outdoor activities in the mountain environment although we are primarily a climbing organization. We also sponsor a number of hikes and increasingly use the mountains in the wintertime for ski touring. We also have a number of members who participate by virtue of their love of the mountains, but who are not physically able or willing to climb.

DR. WALTER TROST

You are apt to visit parts of the mountains that others may not get into?

MRS. JO ANN CREORE

Yes. At least every week we have someone in there.

MR. PAUL BABEY

Would you expand on your third recommendation. What do you have in mind in terms of an independent agency that would do the assessment?

MRS. JO ANN CREORE

I am not prepared to give a specific recommendation as to the agency. I think our main concern is that it not be a geologist or engineer hired specifically by a mining company to make recommendations for the benefit of that company. We feel that a more unbiased opinion will come from perhaps an agency set up independently by the government.

DR. STUART SMITH

As you may be aware, in the United States an impact statement is filed by a company proposing to conduct programs which have significant impact on the environment. This is then reviewed. In each case the company is required by law to file a statement which generally results in a part of government deciding whether it's efficient or acceptable. Do you think this might have some feasibility in our area of Canada?

MRS. JO ANN CREORE

I don't see why not. Perhaps it does not matter whether the government reviews after the statement has come forth, or the statement should originally come from an independent agency. It seems to me it might require less duplication and effort if the original assessment is made by a specially appointed agency.

3.8

Presented By: P. H. Bouthellier
and W. L. Bigg.

Because of the extent of deposits in our foothills and mountain areas, and the certainty of increased demands for, and increased mining of these deposits, very strong measures must be taken to minimize the adverse effects on the terrain and waters in areas adjacent to mining operations.

The objectives must be:

1. No pollution of lakes or streams due to coal mining or activities related thereto.
2. Minimal adverse effects on the terrain from the point of view of aesthetics.

Specific Points Regarding Operations

Waste dumps or storage piles shall be located so as to preclude runoff from such areas draining directly to water courses. In all cases such dumps or piles shall be ditched and drainage therefrom passed through settling basins which shall be maintained. Further treatment to be provided where necessary.

Generally waste shall be replaced in the area from which it is taken, this refers particularly to overburden from open pit mines. It is recognized that in certain areas this is not possible. At such places the landscaping of waste dumps must be carried out so that the result blends harmoniously with the undisturbed landscape.

Reclamation of mined areas and waste dumps should be progressive and should be carried out on a predetermined schedule.

The coal operator must provide, with the application for a production permit, a complete plan of operations which will specify measures to be taken to minimize the adverse effects. This plan should be a legal document and be an integral part of the agreement between the government and the mine operator.

It is felt that in the past the intent of regulations have been circumvented by some coal operators (e.g., Vicary Creek). For this reason it is felt that a charge of say ten cents per ton of coal produced should be placed with the government. Such monies to be returned to the operator when reclamation and pollution control measures are shown to have been effective to the satisfaction of the government.

The onus should be placed on the operator for providing a workable plan for the prevention of pollution arising from the mine operation or any activities in any way related to the operation. Related activities would include the construction of access roads, haul roads, etc. It would include logging operations for the obtaining of mine props. The government will supply the specifications but the contractor determines how the specifications will be met. The governing regulations should not spell out how the desirable results are to be achieved, for if they do, the success or failure of the operation will at best be a joint responsibility and at the worst it will enable the operator to avoid the payment of any significant penalties.

P.H. Bouthillier
P.H. Bouthillier

W.L. Bigg

W.L. Bigg

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

Your submission is mostly related to mountain and foothill mining?

PROF. P.H. BOUTHELLIER

This is true.

DR. WALTER TROST

Again, the problem of choosing a practical balance between strict regulation on the one hand, and terminal standards on the other, presents itself. One of the difficulties with flexible regulations is that different operators might well feel that they are not being treated in the same way; and may therefore claim, and in fact, experience a disadvantage. Do you have any comments on that?

PROF. P.H. BOUTHELLIER

I realize that this could well be the case. I think that if one can point these differences out before the start of operations, then the operator cannot come back and say he was unfairly treated. This is probably the only way. Each area will have some different requirements.

3.9

PEGASUS EXPERIMENTAL METAL AND MINING LTD.

PRESENTED BY MR. ALLEN FENNELL

Mr. Chairman, Ladies and Gentlemen. Unfortunately, because of meetings with the government yesterday, we didn't get a brief in writing but I can take out parts of it that we feel significant though it is not going to cover the whole subject in whole. We were under the impression that this was an environmental meeting with the surface mining in Alberta, not on the foothills coal, not on the mountains, and not on coal period. In other words, we see surface mining to cover gravel pits and any other type of mining including tar sands and it is of quite a significance to us that, if we can have a regulation that covers opening up a hole for coal, the same regulation should cover opening up a hole for gravel. What is good for one is good for the other. The part I will discuss here is how you are discriminated against the more you improve your reclamation. I have had long sessions with the municipal tax department, it is now quite clear that the more money you spend on reclamation, or on equipment for reclamation, the more you are going to be subject to municipal taxes. I was in doubt about this but it is now been verified and I've got copies of the Act. The whole essence of municipal tax is to raise revenue and they don't see any difference between pollution control equipment, or reclamation equipment, it's all the same to them. We are asking that, when consideration is given for reclamation costs, that abatements be given on municipal taxes or equipment that is exclusively or principally for land reclamation. We have done our own study. We intend if all things be equal in operation in this province from 1973 to 1975. Our estimation of land reclamation costs come to 1,200 dollars a day that we can calculate. This is very easily arrived at, that the cost of just operating one V8 cat plus one patrol grader to level out the ground as we go along is \$30.00 an hour per unit. On a 24-hour operation it's easy to see how it gets up to \$1,200 a day. This is acceptable. The capital cost of equipment are acceptable, these can be depreciated. But what makes us nervous is that we cannot predict what the municipality is going to do as far as the tax rate 15 years from now. We feel that instead of using the "big stick", inducements and encouragements should be used. This is not a question of change in the principle that the polluter must pay, but do we have to pay duties, excise taxes, federal sales taxes, municipal taxes, on every piece of equipment that we bring in to improve the quality of the land which we are trying to recover? This is one of the feelings we feel should be brought up. The other factor to do with this is that we are competing on international markets. Whether the coal is used to produce steel in Japan or Timbucktu, it's an international market and it does not relieve the local person from pollution. We do have to realize that if coal, or any other material or mineral that we are thinking of, cannot compete on the world market there are no jobs and there is no money for recreation, there are no cars to go out to the mountains. We must keep a balance in this. The company has done very extensive work in the last three years on the technical problems of coal production. We are now just about, and this is first heard here, but we are now just about broken in the hydrogenation of coal at economic prices so we are not particularly interested in mountain coal, we are interested in lignites and sub-pitch. We don't want the same regulations to apply to plains coal that cover mountain coal. A brief will be in writing on Monday but basically we feel that the government should give some lead in showing that there will be tax relief for work that is done to meet their standards. Thank you.

pollution control or not and are therefore entitled to the abatement. They feel it should be a direct liaison between the government and the company and not the judgement of a municipal assessor on whether your equipment is for pollution control. This is going to come up more and more as in different parts of the environment you have to spend more and more on equipment. We agree and accept this for the capital structure which can be retired, but we disagree that this should be a source of revenue ad infinitum for a municipality.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

In your statement on the same conditions applying to gravel and tar sands and their surface reclamation, you had in mind there that they should be reclaimed to the same standard rather than operate under the same system of regulation, is that right?

MR. ALLEN FENNELL

This is true. We get into a very difficult position if we qualify one material, because it disturbs the land, to a different treatment from another material. Either the land is disturbed or it is not disturbed.

DR. STUART SMITH

I am perhaps a bit confused in your statement regarding the tax load. You suggest a different arrangement than presently applies to taxes on property. For instance, if a householder paints his house and landscapes his property his assessment goes up and he pays more. I am not clear on your proposal for tax abatement.

MR. ALLEN FENNELL

To give you a simple example: If you leave equipment or piles of equipment stockpiled on the ground, you pay tax. If you build an enclosure to control the atmosphere of that equipment you pay tax, in fact the differential is 25 to 45. In other words the more you do to stop wind drift of piles the more taxes you pay.

DR. STUART SMITH

So you are suggesting that, if efforts are purely for beautification or protection of the environment, this should be recognized in the tax structure?

MR. ALLEN FENNELL

It is. The tax act was amended this April to allow this to happen, but discussions with the municipal authorities would prefer that this be taken out of their hands. Now it is the individual assessor who decides whether you practise

National and
Provincial Parks
Association of
Canada

L'association
des parcs nationaux
et provinciaux du
Canada

Edmonton Chapter
13715-101 Avenue
Edmonton, Alberta



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Presented by: Don Meredith

ENVIRONMENTAL IMPACT OF STRIP MINING IN ALBERTA

B R I E F

to

The Environment Conservation Authority

December 1971

In response to the Environment Conservation Authority's announcement of Public Hearings and request for briefs we would like to submit the following as representative of the feeling of the Edmonton Chapter, National and Provincial Parks Association of Canada.

To begin with, we would like to endorse in principle and in detail, the lengthy brief of the Alberta Land Conservation Society, submitted to the Provincial Government in 1969. We have studied this document closely and find its recommendations well-founded in research and paralleling most of those we would submit. However, we would like to submit a number of points which relate directly to our organization's prime concerns.

These are arranged in two categories:

Park-Oriented Recommendations

and

Ecologically-Oriented Recommendations.

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I. PARK-ORIENTED RECOMMENDATIONS

1. Albertans should be aware that the Rocky Mountain National Parks, and in particular Banff and Jasper, will be unable to meet the recreational needs of the province for very much longer. To begin with, they are National Parks, and are intended to accommodate all Canadians, not just those living conveniently close. Furthermore, because their prime purpose is to preserve a wild natural environment, unimpaired by commercial development of recreational facilities, they cannot cater to all forms of outdoor activities. Thus it becomes imperative to have recreational lands available outside the National Parks.

Already much of the open land in the southern plains area, where most of the population is and will be concentrated, is taken up with ranching or farming. In all these thousands of square miles there are only two fair-sized provincial parks: Dinosaur (22,000 acres) and Cypress Hills (78 sq. miles). They are minute compared with the only other blocks of undeveloped land in this region: Wainwright Military Camp and the Suffield Military Experimental Range. The prospect of obtaining either of these for Park purposes seems remote. What is left? The narrow north-south belt of the Foothills, and the much more remote northern half of the Province. In time, we will need parks in both these regions, but at this time the need is greatest in the Foothills, and more particularly, from the International Border north to Hinton-Edson. This section is already accessible by road and is also closest to the large urban centres and intensive agricultural lands. But it is also the section where mountain coal mining has been most active in the past, and where it is most likely to mushroom in the near future.

Thus we recommend that no new mining leases or permits be issued until the Foothills have been thoroughly examined for Provincial Park and Recreation areas, and these areas set aside from all forms of mineral exploitation, but

particularly strip mining. This requires a well planned land use zoning system.

2. Following from the above we would like to enquire what will happen to Willmore Wilderness Park. Will its boundaries continue to be whittled away, so that mining can take place "outside" the Park, until there is virtually nothing left? There are also the White Goat, Siffleur and Ghost River Wilderness areas within the Rocky Mountain Forest Reserve. Although these are not formally designated Parks, they are recognized areas of scenic, recreational and wildlife value. Will these be immune from strip mining or will they be treated as any other land if coal reserves are found? These four areas should be studied very closely before mining expands, to see whether they would indeed be of more long-term value left as they are and used for recreational and wildlife purposes.
3. Although it has been pointed out with truth that successfully reclaimed strip mines have provided good wildlife habitat and recreational opportunities, we would like to qualify this by "certain types of wildlife" and "certain types of recreation". With regard to the former, species most benefitting are game mammals and birds adapted to "edge" environments; that is, an interspersion of herbs, grasses, shrubs and young trees; while the latter includes car-trailer camping in well-serviced campgrounds, boating, fishing, water skiing, snowmobiling and downhill skiing. This state of affairs is certainly preferable to a landscape torn and gouged, sparsely covered by struggling plants and subject to erosion and landslides, with run-off water carrying silt and minerals into nearby streams and so on down into major rivers.

However, extensive tracts of land and wildlife preserves, unaltered by man, even conservation-minded man, are

becoming rarer and smaller. What was Alberta like only 100 years ago? - At least 98% wilderness. There were no farms and few ranches, still a few fur trading posts; 30 years ago? - Probably only 50% wilderness; today? - Perhaps 30% wilderness.

Canada as a country has a tremendous diversity of unique natural environments which we must endeavour to preserve and maintain for a variety of social and educational reasons. If we continue to push wilderness into the corners beyond the cities, farms, mines and harvested forests, we will lose much of this diversity and eventually perhaps it will disappear altogether. Where can we today find a single tract of unaltered prairie, be it short-grass, long-grass or mixed-grass, with its antelope, buffalo, prairie dogs, black-footed ferrets, badgers, long-billed curlew, prairie falcons and countless others, and at the same time without its cattle, horses, introduced plants, truck trails? Yet, to the pioneer farmer the prairie vastness was almost overwhelming, both mentally and physically.

Thus, within our recreational lands system we need not only pleasant accessible places, but remnants of wilderness that offer a challenge to those who want to travel light and on foot into areas where they can explore the wide range of experiences that only wild land can give the adventuring human. We might add that the number of people wanting this kind of experience is not insignificant and shows every sign of growing.

Land, no matter how well reclaimed, cannot be considered wilderness, at least not until several hundred years have passed.

II. ECOLOGICALLY-ORIENTED RECOMMENDATIONS

1. We cannot emphasize too strongly the need for a variety of environmental professionals to be involved in the initial study to assess the lands which could be subject to strip mining. An ecologist, experienced in ecosystem research, should be one of these. A professional is also required in the field of human recreation, hydrology and soils. Once the assessment is complete, the Board who is then made responsible for reclamation regulations and their enforcement, should possess one ecologist as well as other biologists, a geographer and soils engineer. As suggested by the Alberta Land Preservation Society, this group should be kept small and manageable and be in the Department of Lands and Forests rather than the Department of Mines and Minerals, since the latter does not have nor can be expected to have environmentalists and ecologists in its ranks.
2. During the lands survey of the Foothills prior to further mining development, we recommend that a comprehensive cost-benefit analysis be carried out for all the potential uses and on a long-term basis, not just for the next 15 or 20 years.
3. Before a permit to mine is issued, it is most important that a complete hydrological survey be conducted to determine the route not only of surface water run-off, but of deep ground-water drainage as well. With the exception of the Peace, all Alberta's major rivers rise in the Foothills and Rockies. It is critical that the headwaters of these rivers not be damaged, either by mineral run-off, siltation or changed volume flow.
4. WE RECOMMEND THAT NO ALPINE AREAS, (THAT IS NEAR AND ABOVE TREE LINE), WHETHER THEY ARE IN DESIGNATED PARKS OR NOT,
BE OPEN TO STRIP MINING BY ANY METHOD WHATSOEVER.

Alpine zones are the ultimate beginnings of our watersheds. Streams and springs arising there flow into larger streams and eventually into rivers. Thus, if they are contaminated by any type of pollution, the effects will be felt far downstream and a much wider area affected than if pollution were initiated at lower elevations.

The feasibility of reclamation on alpine tundra has to our knowledge not yet been studied in great detail. However, a knowledge of alpine ecology would lead us to predict that it would be extremely difficult, if not impossible for a number of reasons:

- a) Although the Foothills do not receive excessive precipitation as compared with the western slopes of the Rockies and other mountain ranges in B.C., or the Appalachian Mountains in the U.S.A., nevertheless the alpine zone receives a great deal more rain and snow than do the lower slopes. In summer they are subject to brief but frequent and violent thunder and hail storms. These could severely erode unvegetated spoil banks in a short time, even if total annual precipitation is not very high.
- b) Furthermore, maximum snow melt and summer rain more or less coincide at the alpine level, thus creating a short but significant period of heavy surface run-off.
- c) Growing conditions for alpine plants are anything but benign; those that do grow there are predominantly tufted perennials that take years to become well-established and spread, for the growing season is short. In particularly unfavorable years plants may not even flower or have time to produce mature seed for dispersal and the establishment of new plants.
- d) Often the ground surface is not completely carpeted with vegetation, although except on the steepest and most unstable scree it is usually sufficient to prevent erosion.

e) The development of organic soil in alpine areas also proceeds very slowly - at the lower Foothills it has been estimated that 1 inch of soil requires 1000 years to make. On alpine heights it may well take 2 or 3 times that; for in many sites wind blows away most of the organic remains of dead plants, so that the living ones are growing essentially in mineral "soil", that is gravel, sand or rock crevices. If this ecosystem is disturbed by anything as gross as strip mining (together with its attendant roads, work camps and the like), recovery is highly doubtful.

There are also a number of rather shy mammals and birds characteristic of the alpine zone: mountain goat, mountain caribou, grizzly bear, mountain lion, hoary marmot, pika, timber wolf, golden eagle, ptarmigan, to name only the most familiar. Their habitat is not lush and thus self-perpetuating populations require large tracts for survival as well as minimal contact with man if their behavior is not to be altered by his presence or if conflicts of interests, especially those of the predators, are to be avoided.

Additionally, strip mining on steep slopes (an upper limit of 33 degrees has been recommended by research in Kentucky), regardless of elevation, should be banned, as it is almost impossible to stabilize and revegetate such slopes.

5. We recommend that physical restoration on mountain slopes restore the profile of the mountain to what it was prior to stripping. We understand that the usual method on slopes is some sort of terracing. This, while controlling erosion and facilitating plant regeneration, could markedly alter the appearance of mountains and be visible from long distances.

6. When physically reclaimed mine sites are replanted, species of plants native to that locality should be used. This would help the area blend in quickly with its surroundings and would also avoid the introduction of persistent non-native species which would cause an undesirable change in the natural plant community of that area.
7. When new regulations are enacted for strip mining, as this Public Hearing has called for, the requisite regulations for underground shaft mines (coal and other) must also be drafted and enforced. Although underground mines cause a different type of pollution from strip mines, it is nevertheless significant and must be prevented.
8. All mines which now have been abandoned in Alberta without adequate reclamation or cessation of pollution, must be reclaimed fully, no matter what the cost. All evidence shows that although these mines are no longer being worked, they are causing continuing damage to the land, wildlife and watersheds. Those close to highways or towns are, additionally, ugly scars.
9. When trenches are dug during exploration for coal, the company should be made responsible for the proper reclamation of each one, even if commercial quantities of coal are not found on the leased area. Furthermore, all roads developed during both exploration and extraction must be kept to a minimum, have their design and location approved by the Board, and finally be scarified and planted after the operation is complete, unless required for later access.

S U M M A R Y

In summary our organization wishes to submit the following recommendations concerning strip mining in Alberta:

1. That Albertans are in great need of Provincial recreation and wildlife lands, which are rapidly disappearing. reasonably close to the centres of population. The Foothills offer an ideal area for such lands, but are now threatened by extensive strip mining for coal. The Foothills should be examined carefully, not only for its coal resources, but also for its equally important long-term recreational resources, and watershed quality. Zoning should provide for proper land-use control.
2. Concern is expressed about the fate of Willmore Wilderness Park and the White Goat, Siffleur and Ghost River Wildernesses. Will they be mined or will they be protected for wildlife and recreation?
3. We have pointed out the need for a wide range of recreational areas: from well-developed ones to those which provide a foot-only access to wilderness unaltered by human development. Reclaimed strip mines can provide the former but not the latter.
4. Environmental professionals are required to study the ecological, hydrological, geographical and recreational features of the Foothills, in order to advise appropriate land use. Such professionals are also required on any Board drawing up and enforcing mining regulations and subsequent reclamation.
5. A comprehensive long-term cost-benefit analysis is required of the various possible land uses.
6. A complete hydrological survey is required before a permit to mine is issued.
7. No alpine area should be strip-mined. Detailed reasons are given. Also, slopes in excess of 33 degrees steepness should not be mined.

8. Physical restoration should aim at recreating a mountain's original profile.
9. Plants used for revegetation should be locally native species, not introduced or agricultural ones.
10. Rigid regulations should be drawn up for underground mines as well as strip mines.
11. All abandoned mines should be reclaimed regardless of cost.
12. All exploration trenches must be properly reclaimed, filled in and planted; and all roads minimized in number, approved before construction and reclaimed if not required for subsequent access.

Edmonton, December 8, 1971

THE NATIONAL AND PROVINCIAL PARKS
ASSOCIATION OF CANADA - EDMONTON CHAPTER

QUESTIONING BY THE AUTHORITY

MR. PAUL BABEY

Mr. Meredith, on point 8, you mentioned that all abandoned mines should be reclaimed regardless of costs. Who should bear the costs of these operations?

MR. DON MEREDITH

Well, ideally I imagine the miners should, but I am not sure whether they are legally responsible. I would say the mining companies would be the first ones to hit, and if not possible, I imagine the taxpayer should have to absorb the cost.



**S. ALBERT & DISTRICT
ASSOCIATION**
BOX 158 ST. ALBERT ALBERTA

3.11 Environmental Impact
 of
 Surface Mining
 in
 Alberta

Submission
by
St. Albert and District
Fish and Game Association

December 17, 1971

Environmental Impact
of
Surface Mining in Alberta

Gentlemen:

First, let me compliment the Alberta Government for reacting to the need for a comprehensive act updating our control of destruction of Alberta's land surface. Today's large scale mining methods, coupled with accelerating demands will most certainly result in massive and unacceptable damage if we do not very carefully manage our resource extractions.

Our association also thanks the Environment Conservation Authority for the opportunity to present our views. Your concept of aiding the government in preparing this legislation through first researching the problem, then surveying the interested public via these hearings is excellent.

We would also compliment the Department of the Environment on their position statement regarding the proposed legislation. The general philosophy as presented looks good to us.

The St. Albert and District Fish and Game Association has been actively campaigning for surface mining legislation for some years. In a 1969 public education project, we presented a film on surface mining impact to seven Edmonton High Schools, and also addressed eight local clubs and organizations on the subject. We have a file of letters to government going back

three years. We have also proposed resolutions and policy statements which have been adopted by the Alberta Fish and Game Association. We are very pleased that this much needed legislation will finally come about.

I would like to now address some essential objectives for mining control in Alberta. We must first accept that any surface mine in our foothill and mountain country is and will be an ecological disaster area. It is not possible to "reclaim" a mountain that is blasted and bulldozed or a foothill with the side cut away. A strip mine in steep slope country is an irreversible, one-time use of that land, and the resulting eyesore will out live all of us. The mine also degrades all the terrain within eyesight or ear shot. It is generally accepted that any surface mine destroys four times the actual mine area.

It is therefore essential that we do not permit strip mines to become scattered throughout the east slopes of the Rocky Mountains. They should be located only in corridors near existing transportation facilities. Alberta's known coal reserves will satisfy the projected demand for at least 500 years, so there is no need to disturb remote wilderness or land with high recreation potential now.

It then follows that a zoning plan for our Rocky Mountain east slopes is urgently needed. This zoning plan must give strong emphasis to the great recreation potential of this land

for our fast growing populations. It must be accepted that strip mining and recreational uses are not compatible in any area. For zoning purposes, renewable resource and recreational resource potential must have priority over surface mining.

The first objective, then, of our mining control legislation, must be to ensure that the mines are grouped into a few areas of high utilization. Thus the recreational, and renewable resource potential of much of our east slopes can be preserved.

Our second objective should be to ensure that no permit to surface mine is issued until we know the affected land has no other short or long term potential of equal value. This will require careful cost-benefit analysis and public discussion. The real values of wilderness, natural beauty, solitude and wildlife are hard to assess, but our club places a high value on these things, and urges that they always be given strong consideration. The state of West Virginia permits no surface mine on state-owned land without an act of legislature. We feel this is a good idea.

Our next objective must be a minimum of environmental damage from the mine and its access roads. We agree that "comprehensive environmental planning before the fact" and "responsibility on the resource user" as suggested in the position statement are the keys to meeting this objective. However, prevention of water pollution, and especially siltation should be given

special consideration in our steep slopes. These slopes are headwaters of most of the streams and rivers which are essential to the well-being of all Albertans. Watershed protection cannot be over-emphasized.

I shall not touch on the specifics such as bench width, highwall reduction, slope angles, etc., etc. States such as Montana, Pennsylvania, West Virginia and Kentucky have good regulations which can be tailored to Alberta's needs.

However, regulations are only as good as their enforcement. This brings us to objective number four which is effective administration of the act.

We feel that a Reclamation Board should be established to administer the legislation. It should exist under the Department of the Environment, and should have a majority of members who are expert in forest, land and wildlife management. The board must not be answerable to the Department of Mines and Minerals.

We heartily agree that exploitation of a non-renewable resource is a privilege and not a right. Consequently, we feel that any user abusing the privilege should lose it. In the past, an operator that created one mess could get a permit to create another. We would hope that, under the new act, any operator whose operation does not conform to plan would not be eligible for a new permit until his current site meets requirements. Also, the act must have a "stop order" clause which can be applied

whenever an operation begins to create serious unforeseen problems.

I would like to summarize by repeating the four key objectives that Alberta's new surface reclamation act must achieve in the Rocky Mountain eastern slopes.

First, it must limit the area of disturbance by grouping strip mines into high utilization corridors, and prohibiting them elsewhere.

Secondly, it must never permit the single, destructive use of a parcel of land until we are certain that the land does not have greater value for any combination of non-destructive uses.

Third, the act must assure the minimum possible on-site and off-site environmental damage.

Last, the act must guarantee effective administration of its requirements.

In closing, our club supports the philosophy, conceptual framework and principles of the proposed legislation. We look forward to an effective act. Thank you for the opportunity to present our views.



D. J. Hayden, President



J. N. Monaghan, Secretary-Treasurer



G. C. Stretch, Policy Chairman

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

You were emphasizing the value that cost-benefit analysis might have. You also drew attention to the need and the importance, in your own view, of evaluating wilderness, natural beauty and wildlife. Have you a way to suggest how we might evaluate in the cost-benefit analysis?

MR. GORDON STRETCH

In some areas there has been some work done. For example, in evaluating Rocky Mountain sheep, that type of thing or economic value. Some of that can be applied. I am aware though that the final decision will have to be subjective and for that reason I think that public hearings as well as the direct dollar cost-benefit are really essential.

DR. WALTER TROST

In other words it is not too easy to place a value on the look of the mountain?

MR. GORDON STRETCH

I would agree with that. However I would like to add that I don't think it is possible to over-value those subjective benefits. If we look back over our history, I do not think there are any areas where we look at the land disturbed and say, "Oh, it's too bad they went to all the expense to make this look better". It's always the reverse that is true; we look and say, "What a mess that is, it's too bad that it couldn't have been done with a little more thought at the time". So I would say that the esthetic values really cannot be over-emphasized, particularly in view of the growing population and growing recreational needs.

DR. WALTER TROST

What is the possibility of reclaiming strip mined land to turn it into a recreational area?

MR. GORDON STRETCH

Yes, there are places where this can be done. For example, some of the deep pits in the foothills are currently stocked for fishing, and campsites were built in the area. But we have to accept effective reclamation. In the steep

slope country it is not possible. I think we have to write-off the mine site. We should limit the areas that we are damaging but I don't really think it is possible to effectively reclaim steep slope country.

DR. WALTER TROST

Then you support the position put forth by Mr. Meredith, about the dangers of mining at timber levels?

MR. GORDON STRETCH

Yes, I do.

3.12

STERLING COAL VALLEY MINING COMPANY

Presented by: Mr. Curtis Roberts

By way of introduction, Sterling Coal Valley Mining Co. began operation in the early 1900's when my Grandfather, Mr. Curtis B. Munson supplied coal primarily to the Canadian National Railroad. Since 1955 the mine has not been operated. We are not only interested in these proceedings from the standpoint of our heritage, but also with the re-emergence of coal as a vital industry, what is said here will affect our Company's future.

When we talk about environment, we are talking about people - the action of people to land, people to air, people to water, people to animals, people to weather, and the actions of people to each other. There is no form of enterprise or activity on this earth that does not affect the environment. We can accurately assert that almost every activity of man or beast as well as every breeze or rainstorm, every cultivation of soil or harvesting of crops, including mineral and timber, affects the environment in which we live. Perhaps mankind's sudden awareness of the vulnerability of his environment will initiate his greatest and his most critical endeavor of the twentieth and twenty-first centuries. We will attempt to recover what numerous centuries of indiscriminate desecration of the environment has wrought on our world, and we will attempt to insure by means of recycling, utilization of waste, voluntary control, and legislation that continuance of this suicidal course is stopped once and for all. The problem is nothing short of man's determination to survive on earth. Every responsible human being will sooner or later be forced to address himself to this predicament. Obviously fundamental decisions having far reaching implications are going to have to be made, which is the problem at hand. What fundamental decisions are going to be made regarding strip mining in Alberta?

Due to the geographical position of the Alberta coal fields from their markets, and the shortage of transportation facilities, strip mining provides the only significant advantage to compete in world markets at present. The reason for this is that in strip mining the output per man day is roughly 100% higher, overall recovery of the coal is 60% higher and

operating costs are 25 - 30% less than underground mining. Also the amount of automatically recoverable coal is increased to 95% as opposed to 50% when mining underground. Let us make no mistake, when we discuss the future of strip mining in this Province, we are really talking about the future of the coal industry in Alberta along with all of its far-reaching implications in the Provincial economy.

The chronic problem with strip mining is that if unreclaimed, particularly abhorrent and subsequently dramatic scars are left on what was land in its natural state. In the process various side-effects may occur; interruption, diversion or pollution of streams; an upset in any one of the delicate components which are vital to the natural cycle such as the water shed of the area necessary to vegetation. These problems, of course, have repercussions in adjacent areas. Admittedly these are problems which need to be corrected or avoided. To accomplish this will require time, technology, and money. We in the industry are deeply interested in developing an ecological set of standards to assist in the operation of a mine. We think that a firm and fair Alberta reclamation law is desirable and necessary in that it will channel diverse energies and enterprises towards a solution to our common problem. We only ask that certain indisputable facts be recognized in the drafting of any legislation governing strip mining.

First. The economic burden and the responsibility of the many facets involved; development of required technology, determination of the best potential land use and the final conversion to its reclaimed state cannot

be born solely by the coal operator involved without causing him to become economically non-competitive.

Second. Because of the critical energy requirement forecasted for world consumption during the next ten years; and because of the comparatively advanced stage in the recovery of oil and natural gas deposits in our area, consideration and every assistance be given to the rebirth of an industry which in the past contributed much to the wealth and health of this Province. In its re-vitalized infancy this industry can ill-afford unrealistic, punitive or restrictive controls which would only serve to strangle it.

Third. Any legislation enacted be of a flexible nature. Flexible enough to realize that ecological problems indigenous to the Drumheller area of Alberta are not necessarily identical to the Sterco - Coal Valley region.

Fourth. A workable definition of "environmental quality" has to be established. This again will necessarily have to be flexible. Attempting to reconstruct the land "as it was" is not a workable definition. It is costly with little or no return and in the end may not be the answer. Priorities in land usage must be considered and organized. We urge studies into the feasibility of reclamation with a possible by-product in mind. As an example I would like to cite our own experience. During the period 1900 through 1955 Sterling Coal Valley Mining Company extracted about 10,000,000 tons of coal from the Coal Valley pits. The customary scars are there even though efforts were made to level and seed the area. However, nature herself has taken a

hand and now large amounts of huckleberrys proliferate there. As this seems to be one of the few areas where significant quantities grow it is not outside the realm of possibility that huckleberry farming could be a by-product of any reclamation in this area. The point here is that we need imaginative people to make the best possible use of the land which will both offset the costs incurred and be compatible with the environment.

The economic, social, and environmental impact of strip mining on any large scale, poses awesome problems. It requires nothing less than comprehensive, regional, environmental planning to anticipate the problems. We must seize the opportunity to employ the same planning tools in shaping a humane environment for man in an undiminished natural environment. To this end we briefly outline the following proposals and recommendations:

One. A complete ecological inventory of each proposed mining site. This inventory would provide base data before any disruption of ecological systems have occurred. Data should be gathered on soils, water resources, surface geology, vegetation, wildlife, and topographic features.

Two. Each ecological inventory should be evaluated by a team of diverse specialists with a working knowledge of ecological principles. Development options with least environmental costs should be formulated. Opportunities for environmental enhancement should be explored. A program for subsequent rehabilitation of mined lands should be initiated in progressive stages.

Three. A regional ecological inventory or, a system analysis of the regional resources inter-relationships should be prepared. We are not talking about a mere summation of the aggregate substance and "things" of nature. We are instead talking about the ecological study of the unseen interacting processes and the subtle interdependent relationships which exist within the natural resources systems of Alberta. After the base data has been assembled the consequences of induced changes should be evaluated by the various governmental agencies involved. Every proposed change creates secondary changes, which reverberate throughout all of the interacting, interdependent systems of the environment. With adequate planning the adverse side affects could be avoided and beneficial changes could be promoted.

Four. Alberta's capabilities to undertake this comprehensive regional planning effort are limited. We, therefore, propose that a mission oriented, regional planning organization be formed to undertake this task. The participants in this organization should include both the Alberta Government and its University system; agencies of the Federal Government, and the Industrial and coal organizations. Such research competence and outside expertise as is required for this innovative planning effort should be sought out and engaged wherever in this Country it is available.

In view of the deep concern for Alberta's environment which has been expressed by our Government and the public at large, we are confident that the efforts necessary to create and fund the planning mission can be carried to a successful conclusion.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

You have made a strong submission in support of not only the integrated planning for mining and reclamation but also for regional planning, so that the different aspects of resource development uses within a region can be worked for the benefit of all. You indicated in your cost statements, and I understand them to be approximate, that the cost of stripping coal produces a product at about 25% less than underground methods might do. Since the downfall of the coal market after strip mining methods were beginning to be used, presumably it wasn't the cost comparison between underground and stripped coal that lost it its market, but its competition with other forms of energy. Is that right?

MR. CURTIS ROBERTS

That's right.

DR. WALTER TROST

Your cost figures, are they related to mountain, foothill or prairie coal?

MR. CURTIS ROBERTS

Foothill mining.

DR. WALTER TROST

So that the competitive markets comparison were only between underground and stripped coal and if stripping is 25% less, presumably it could bear some reclamation costs?

MR. CURTIS ROBERTS

If I understand you correctly you are making a direct comparison between simple strip mining and the simple underground mining. Before I answer that I would like to indicate that I am not particularly qualified to answer all these questions. The individual that was scheduled to make this presentation is ill and I am a second stringer, but as I understand it, yes, these costs could be reduced and some reclamation costs could be borne. To what degree I do not know.

DR. WALTER TROST

Your paper suggested that the costs of reclamation might be sufficiently extensive that the coal operator shouldn't bear them himself. Is the suggestion a kind of subsidy?

MR. CURTIS ROBERTS

Yes. What we are suggesting is that the initial stages: exploration into an area; regional planning, etc. should be carried out by the government. Obviously the reclamation would have to be borne by the companies involved, but the purpose is to offset these costs in some manner. My example was huckleberry farming. If imaginative people could figure out other methods of making their individual mining sites compatible to the environment and off-set these costs with some sort of by-product, then that would be the most advantageous method.

MR. PAUL BABEY

I was interested in your remark about the ecological inventory for each mine site. Is the data that would be essential for this type of inventory available? Is it a matter of collating it, or is it a question of much needed research being done to provide some of the things that might be unknown?

MR. CURTIS ROBERTS

I think that this data is available. I think the specifics, for instance, if you are talking about foothills area there is a certain amount of data involved, but if you are talking about an individual mine within that framework, then you would have to do a certain amount of research to find specific facts in this particular area. In that capacity there is a lot of research work to be done.

MR. PAUL BABEY

The application of the ecological inventory would be used in developing the reclamation program and the mining operation?

MR. CURTIS ROBERTS

Right. It would determine what aspects of the environment that were being upset or would be upset by induced changes by strip mining.

DR. STUART SMITH

Would you care to comment on the feasibility of the company with all its associate expertise in soils, engineering, mining, geology, and so on, having a total involv-

ment in research. Rather than having governments or universities carry it out, the mining companies should be involved. First of all I think they would believe it more if they were involved. Would you care to comment on this?

MR. CURTIS ROBERTS

I am not sure I understand what you're saying.

DR. STUART SMITH

I am talking about a total involvement in research where all agencies or all companies should have some input, rather than making it the responsibility of one.

MR. CURTIS ROBERTS

I think this is necessary. But in a hypothetical situation where a mining concern approaches the government with a request to explore a certain area or mine a certain area of land, the company is not actively engaged in this area. At this point it is just as much a burden to them to go out of their way to collect all this data, as it is for the government. The only difference is that it imposes an economic burden on the company and thus has to be reflected in their cost. I think the government has more access to the experts that are necessary through the university system. As we said, these are the people that would be more qualified to determine and more impartial in making a decision in this matter.

DR. WALTER TROST

There is a point in the reclamation procedure in which the land is going to be turned over to the agency that then uses it. Of course the involvement of that person is inseparable to the successful reclamation procedure. How do you see, in your thinking, the involvement of what might be called the ultimate user, the subsequent user after the reclamation?

MR. CURTIS ROBERTS

You mean involvement with the land in some economic sense?

DR. WALTER TROST

Involvement with the planning of reclamation.

MR. CURTIS ROBERTS

The company obviously has to be committed to reclamation.

DR. WALTER TROST

I don't mean the mine company now but the person or the agency that will be responsible for managing the reclaimed situation. It could be a farmer if it were farmland, it could be a recreational agency if it were turned over to recreational use and it could conceivably be the Crown.

MR. CURTIS ROBERTS

What you are saying is, to what degree do we think that they should be involved in the initial planning of this reclamation? First of all it has to be determined what use can be made of this land. Then, going back to our example, if huckleberry farming is the end use, we should get a huckleberry farmer who is interested in that area to be involved actively in the original plan for reclamation. I think that is a valid point.

3.13

CANADIAN UTILITIES, LIMITED

SUBMISSION

TO THE

ENVIRONMENT CONSERVATION AUTHORITY

RE: SURFACE MINING IN ALBERTA

MR. GORDON CAMERON

Presented at
EDMONTON, Alberta

December 17, 1971

Introduction

Canadian Utilities, Limited, together with its associated company Northland Utilities Limited, generates, transmits and distributes electrical energy for industrial, commercial and domestic use. The company is not engaged in the mining of coal, but its use of coal for the generation of power is significant at this time and is expected to grow substantially in the foreseeable future. It may be mentioned in passing that Northland Utilities is also engaged in the natural gas business.

The areas served by the companies with electrical energy are principally east central Alberta and the northern part of the Province, containing an aggregate population of about 210,000. Cities and larger towns served include Grande Prairie, Drumheller, Lloydminster, Fort McMurray, Peace River, Stettler, Vegreville, St. Paul, Vermilion, Hanna, Jasper and High Prairie. Also served, through rural electrification associations are almost 18,000 farms with an estimated population of about 68,000.

The companies' generating capacity, most of which is connected to the provincial grid, is approximately 367,000 kilowatts. Of this, 212,000 kilowatts are installed at the Battle River Station, using surface-mined coal. The remainder is mostly comprised of gas turbine plants in the northern part of the province. An additional coal-fired plant with a capacity of 150,000 kilowatts presently under construction at Grande Cache will be on line in 1972, and a further 150,000 kilowatts is planned to be installed at Battle River for 1975.

Summarizing the 1975 position, the bulk of the generating capacity will

be concentrated as follows:

Battle River Station using sub-bituminous coal from the Forestburg/Halkirk coal field	362,000 kilowatts
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Grande Cache Station, using middlings coal as a by-product of the McIntyre-Porcupine coal mine	150,000 kilowatts
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The McIntyre-Porcupine coal mine produces principally for the export trade, and as Canadian Utilities' involvement, as a fuel source, is confined to the by-products, this brief will not comment further on that coal field.

In the Forestburg/Halkirk coal field surface mining has been carried out for more than twenty years. Present operations are being conducted by subsidiaries of Alberta Coal Ltd. and Luscar Ltd. To date, Canadian Utilities has taken less than a quarter of the production from the field, but in the future, a much greater proportion of production is expected to be used for generating electrical energy. Accordingly, this brief will focus upon the Battle River Station area.

The Battle River Station

The Battle River Station is a modern coal-fired thermal power plant incorporating the required safety and pollution control systems as specified under various regulatory bodies. The siting of the plant is based upon a very substantial and satisfactory supply of sub-bituminous C coal. The remaining measured and indicated coal reserves contained within a five-mile radius of the power plant are 100 million tons. Of this amount, the Battle River Station is expected to consume 70 million tons over the next thirty years.

The expected extent of future mining in the coalfield will cause about nine thousand acres of land to be disturbed. Present land use of this acreage is about half pasture and half farming.

The measured and indicated reserves of sub-bituminous coal contained within the plains region of Alberta are estimated, in paper 70-58 of the Geological Survey of Canada, at 7.4 billion tons. This large natural resource has a significant economic potential of which the present usage for the generation of electrical energy by all utilities in Alberta comprises only a minimal amount.

In addition to supplying Albertans with clean economical electrical energy, the siting of the Battle River Station has provided other positive results to the public's interest. After construction of the dam and the creation of a new reservoir, an area surrounding a portion of the reservoir was deemed sufficiently attractive to be converted into a new provincial park now referred to as the Big Knife Provincial Park. Last year more than thirty thousand visitors enjoyed the scenic recreational facilities of this new park. As Mr. C.H. Harvie, Provincial Parks Planning Supervisor, has stated, there would not have been a park there today were it not for the creation of the lake by Canadian Utilities.

Electrical Energy and the Environment

Electrical energy in its ultimate use is the cleanest form of energy available, and the widespread use of it across Alberta in lieu of alternative forms of energy is a factor in the preservation of the environment. Indeed electricity is relied upon as the energy source necessary for the numerous

activities involved in processing pollutants, in order to clean up the environment.

However, the production process of this clean energy presents some problems. At the company's new coal-fired thermal power stations the control of various pollutants is being monitored and large expenditures have been and are being made to minimize the amount of pollution produced by the operation of the power plants. Continuing effort is being expended to determine the amount and effect of both air and water pollutants with the purpose of achieving rational and balanced pollution control. Flyash particle emission is being monitored and controlled to meet governmental regulations. At the Battle River Station, the water used for cooling purposes is being monitored by plant personnel on a daily basis in connection with the operation of a meteorological weather station located on the bank of the reservoir adjacent to the power station. At the Grande Cache Power Station the installation of a cooling tower will avoid undue heating of the river.

In this industry, the production process has become highly centralized, and in the case of Canadian Utilities, this centralization is in areas of low population density. This concentration of surface disturbance is an environmental advantage: the disturbance is confined to two or three locales rather than being spread out over numerous small mining operations.

Aesthetics, Economics and Future Land Use

It should be appreciated that surface coal mining is but one disturber of the surface. Nature herself is the prime disturber: an interesting

example in the Forestburg/Halkirk area being the burning out by nature of portions of exposed coal seams resulting in the distinctive reddish colour from which Paintearth Creek presumably derives its name. Examples of man as disturber are the removal of forest cover for agricultural purposes and the construction of roads and urban settlements. Aesthetically unpleasing examples, depending on one's point of view, include not only the foregoing, but also the derelict farm structures becoming more numerous with the trend towards agricultural consolidation.

It is presumably widely appreciated that the market value of land re-claimed in any manner is less, and usually much less, than the cost of reclaiming it; which is merely to say that there is no economic basis for reclamation. For example, the market price of farmland in the vicinity of the Forestburg/Halkirk mining operation is about \$150 per acre whereas reclamation to good pasture could cost in the order of \$1,200 and to farmland possibly \$3,500. These costs could be even higher if unreasonable time limits were to be prescribed for the completion of the reclamation.

Reference is made to the benefit-cost analysis in part five of the F.F. Slaney report commissioned by the Environment Conservation Authority. The product itself, coal, does not appear in the analysis. This perhaps is because, part five being in very general terms, it must envisage cases where the product is exported and cannot therefore itself be a "benefit to Alberta". But in the case of surface-mined sub-bituminous coal, most of it is used for the generation of electrical energy used in Alberta, and thus the benefit is widely diffused throughout the Alberta community.

One newspaper report has mentioned the loss of municipal property tax revenues from disturbed surface land. To put this in perspective, if we assume the entire Forestburg/Halkirk coalfield to be covered with farmland, which it is not, and if we use the top assessment rate of \$40 an acre, then the maximum surface property tax assessment involved would be less than \$500,000. The 1971 property tax assessment of the Battle River Station alone is \$5,631,490, so that even ignoring all the assessments on the mining companies' properties, and ignoring the 70% increase in generating plant capacity planned for 1975, the present assessed values are at least eleven times greater as a result of the mining of the coal.

On an aesthetic basis, most types of reclamation are suitable. Canadian Utilities favours wildlife habitat as best satisfying aesthetic and economic needs for the area surrounding its Battle River Plant. Other plant sites may lend themselves to or require different treatment. There is not only a wide range of conditions between foothills and prairies, but also considerable variation of conditions between different fields.

In dealing with agronomy problems associated with surface reclamation, it should be appreciated that expertise within any one producer organization is necessarily limited. It is to be hoped that research facilities and advice will be readily available from the appropriate Government Departments, somewhat on the lines that the farmer may seek advice from the district agriculturist.

Recommendations

monopoly

Canadian Utilities, as a ~~rate~~-controlled utility company, endeavours to play a responsible part in the broad social scene. It tries to serve as an example by improving its standards of good housekeeping in structures and mobile equipment, and supports organizations with compatible intent. In the matter of surface reclamation, Canadian Utilities wishes to be on record as being in favour of balanced and reasonable reclamation schemes to maintain the aesthetic quality of the province.

Clearly the legislation must reconcile the needs of society at large for electrical energy, with the needs of the same society to preserve the environment within which it exists. Towards this end Canadian Utilities makes the following recommendations:

- (i) The legislation and regulations should not attempt to prescribe specific solutions, but should outline broad objectives and make provision for an agreed prior plan.
- (ii) The legislation should provide for producer participation in the planning process.
- (iii) The legislation should encourage the planning not to be bound by past land use, which may or may not have been good land use, but instead should encourage planning to be imaginative in approach.
- (iv) The legislation should not permit the uncertainties of open-ended costs to be placed upon industry, and particularly not retroactively. Otherwise there is danger that industrial activities which would benefit society as a whole might be excluded by the upper limits of uncertain reclamation costs.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

This brief is particularly interesting in that it sort of closes the circle. We start off with coal and wonder whether we should use it and what its benefits are. Finally the coal is turned into energy and then the energy is consumed in our homes. For our own information and for a matter of record, could you tell us how the Canadian Utilities fits into this cycle, stressing the economic side of it. You buy coal under certain restrictions and you sell power under certain restrictions?

MR. GORDON CAMERON

Yes, this is correct. As I said at the beginning, we do not mine the coal. We have contracts with coal companies who supply the product to us. It is at a pre-arranged price with an open end being that additional costs might be required by the coal companies to expend in the reclamation of the coal piles. We do pay an additional amount and of course we are naturally concerned that they get the best return from the reclamation efforts and developments so that we can also get the best price from them. What happens of course is that we are a regulated utility, we have to appear before a public utilities commission anytime that we decide that we want a rate alteration and we have to justify our rate base. Then once that is justified we have to convince the public utilities commission that we are entitled to 5, or 7, or 10 percent return on our investment. This takes a great deal of time and is of great concern to us when we are dealing with a product such as coal where we are afraid there could be open-ended cost which we couldn't do anything about because you cannot go running to the public utilities commission and have anything happen over-night. This process usually takes between two or three years from the time you put your arguments together and realize what it is you are going to have to come up with to satisfy them.

DR. WALTER TROST

In principle you could be caught in a temporary squeeze because you are open-ended in one contract and somewhat close-ended on the other. Is that correct?

MR. GORDON CAMERON

Yes.

MR. GORDON CAMERON

That is correct.

DR. WALTER TROST

You bear them as long as you can and finally go to the public utilities board and you may say to them "We have these extra costs per ton and we therefore need to have the rates raised by so much "; so that you have to come up with specific figures during the process at both ends?

MR. GORDON CAMERON

Yes, this is correct. I wouldn't want to leave the impression that just because of a slight increase in reclamation costs, that we would have to go through this lengthy process with the Public Utilities Commission. There are a number of things involved, the cost of mining is the main thing, interest rates, the demand on capital and on equipment and so on, but this would be part of what we would have to show as an increase in rate pay.

DR. WALTER TROST

These hearings are somewhat informal and I was trying to get a feeling for the magnitude of the reclamation costs as they might be reflected in a change in the rates of electricity.

MR. GORDON CAMERON

What I could do is ask people to take a look at it and see if they could come up with a figure. We would pass that on to the Authority as an appendix to our brief.

MR. PAUL BABEY

I am interested in what happens to the land after it is reclaimed in your particular area on the Battle River.

MR. GORDON CAMERON

There again it is not our land, it's the mining company's. What has been happening so far with the reclamation on the north side of the Battle River is that each year there are more and more deer and small wildlife coming into the area through the brush. On the south side of the river they have a tougher situation, they

DR. WALTER TROST

But apart from that, in time, the expenditure of costs on reclamation would be of no concern or interest to you, is that right?

MR. GORDON CAMERON

That's correct.

DR. WALTER TROST

Is it possible for you to give an indication of what the increase in rates might be related to reclamation required to a certain level?

MR. GORDON CAMERON

I am afraid I cannot answer that. In the audience we have our mining engineer and I believe Mr. Stirling is here, maybe he would care to take a stab at that. It is fairly involved when coming up with some type of an answer because there is a certain amount of leeway that the coal companies have naturally, and I am not sure that they would be agreeable to even allow us to see their inner workings financially or whether we should agree to having them charge us more for the coal. It gets fairly sensitive in that area I believe. I agree it would be a very interesting to have but I am not sure that we could even guess.

DR. WALTER TROST

In the processes of negotiations, the coal companies have to come to you and say, "We are going to charge you so many cents more a ton because reclamation standards are being changed and it will cost us so much more?"

MR. GORDON CAMERON

They can do it, yes. Actually what they do now, subject to correction, is that they tell us what they pay for reclamation.

DR. WALTER TROST

Then you have to bear those costs if it is in fact a legal requirement on the coal companies.

have an awful lot of clay and very little glacial till or topsoil and they are having a hard time getting anything to take hold. Although they are very close, the two areas are separated by the creek; the area on one side is much simpler to reclaim in to some sort of a wildlife habitat. The closest town is about seven miles away, right out on the bald prairie, and we sometimes feel that too many people refer to environmental pollution or esthetic pollution, whereas it is environmental change and that doesn't necessarily mean pollution. It might appear ugly to somebody who is a flat land farmer who might appreciate flat land, but to other people it might make a bit of a break in the horizon and may be quite appealing.

MR. PAUL BABEY

Is that land not suitable for agricultural purposes for the production of cereals?

MR. GORDON CAMERON

Apparently about half of the 9,000 acres referred to.

DR. STUART SMITH

You compare the investment cost of land at so much an acre with another figure and I am not sure I could agree. Investment costs even up to \$3500 in perpetuity on productive land wouldn't seem to me to take long to write off. You people now are talking about 10, 15 years write-off on investment so I wonder is it really fair to compare an investment and reclamation cost on a total in perpetuity production with an actual land cost?

MR. GORDON CAMERON

Here again, these are not my figures. The gentleman that worked them out may want to speak on them, but I think what we are saying is land that has been bought within the last two years in the area of \$150.00 an acre; with reclamation costs is going to be \$3500.00 an acre and there is no further interest in the land as a coal mine or a supplier of electric energy. You must try and sell it and you are not going to get \$3500.00 an acre. I think this was the point that was being made in the submission. We are not saying that the land would never produce again but it would be difficult to change ownership and recover that cost factor.

3.14

MCINTYRE COAL MINES LIMITED
Presented by: T. L. Bedard

BRIEF TO THE ENVIRONMENT CONSERVATION AUTHORITY

December 17, 1971

INTRODUCTION

McIntyre Porcupine Mines Limited have held mineral leases either directly or indirectly in the Smoky River area of Alberta since the early 1920's. It was not until 1968 that a market and transportation facilities were available to enable development of this property. As the present time, McIntyre Coal Mines Limited, the operating company, have two underground and one open pit coal mine producing a total of two million long tons clean per year in the Smoky River area of Alberta.

As mine operators, we welcome this opportunity to present this brief on environmental matters to the Environment Conservation Authority.

The brief first covers the work that McIntyre is doing to protect the environment in our exploration and mining areas. A second section attempts to make constructive comments on statements contained in the draft prepared by the Department of the Environment, dated November 19th, 1971, and around which legislation on surface reclamation is to be developed.

ENVIRONMENTAL WORK BEING DONE BY MCINTYRE

In the past few years, the coal mining industry in Western Canada has become more aware of their responsibility to preserve the environment for the future. McIntyre is included in this group and has always co-operated with the different government departments concerned. Procedures have been set up to clear all proposed plans and obtain complete approval before proceeding with any mining or exploration. Field inspections are carried out in a co-operative attitude and McIntyre believes our relationship with the regulatory agents is excellent.

To ensure that this co-operation continues, and that the lines of communications remain open at all levels, monthly meetings are held between McIntyre and representatives from the Lands and Forests, the Department of the Environment, the Department of Mines and Minerals and any other interested government agency. Within these meetings, future plans, current progress

and expected and encountered problems are discussed.

Precautions were taken in our original plant design to prevent pollution of the Smoky River. Early in 1969, McIntyre began to monitor the quality of water in the Smoky River and we have found absolutely no change in the quality of the water. This work is done in conjunction with the Department of the Environment. In co-operation with the Lands and Forests, McIntyre is studying the effect of various seeding and fertilizers on our exploration areas, both at high elevations and at current mining elevations.

In addition to the work done in co-operation with the regulatory agents, McIntyre has funded a project with the Research Council of Alberta in which McIntyre will be assisted in defining possible environmental problems that may arise in the Smoky River area. Once these potential problems are established, research work will be done on the solutions of any areas of groundwater, surface and drainage water, re-vegetation and slope stability.

COMMENTS ON THE POSITION STATEMENT

(a) The position (2.3) of the Department of the Environment is that the resource user has the responsibility of identifying the potential problems and proving that these problems will not create irreparable damage by taking necessary corrective action. In the main, McIntyre agrees with the philosophy with the majority of problem areas being siltation of streams, revegetation of land and stability of spoil areas. However, it must not be forgotten that unexpected unknowns can always occur and it is imperative that legislation allows the industry flexibility in their actions. In the area of conservation, there must be helpful co-operation between the regulatory agents and the industry.

(b) The position (2.5) is that the use of a resource allocation is subject to termination as the balance between resource development and environmental matters may determine. This position is highly unacceptable to the mining industry. Mining already is a very high risk, high cost industry, and if the potential were there for the government to take away mineral leases that had already been assigned, and in which money had been invested, the risk factor would be increased even further. Exploration for, and development of mines is very expensive and the industry would be even more hesitant to invest in these areas if their mineral leases were liable to be taken away from them with no recourse on their part.

This is not to suggest that once a company have been given leases in an areas, they could forget about environmental problems. If problems do arise beyond the control of the industry, rather than legislate to reinstate certain allocations, it would be better for the regulatory agent and the industry to co-operate in obtaining solutions.

(c) The position (2.6) is that public hearings or legislation debate be held prior to the granting of exploration or mining rights. Public hearings are both expensive and time consuming for the government, and for the companies involved. It is McIntyre's opinion that this time and money would be better spent by capable people (regulatory agents and the industry), working on the problems and solutions to determine if an area should be allocated rather than in public hearings. It may be that certain groups, local and/or provincial, could be contacted for their opinions on each individual case, but that public hearings in general are not necessary and will detract from the time available for the regulatory agents to do their work.

During the last two years in McIntyre's dealings with the Lands and Forests, the Water Resources, and the Department of the Environment, we have found them technically capable, fair and considerate of public opinion. They can be relied upon to make a proper decision without the requirement of a public hearing within the general framework of current legislation.

(d) The positon (4.07) is that reclamation should proceed simultaneous with operations. In theory, this idea is good, however, each mine or exploration area has its own peculiar situation. Some exploration areas will be mined shortly after exploration and, as a result it would be ridiculous to require reclamation until an outline of the area to be mined is determined and operations begin. However, work on reclamation of mining areas can begin almost immediately in some areas and our No. 8. Mine is a good example of this with backfilling of mined out areas started only six months after development began and less than one year after exploration began.

The timing on reclamation will vary with the individual case and the authority must be left with the regulatory agents to define, in co-operation with the operator, a realistic reclamation schedule. At the same time, procedures must be determined to prevent deterioration of the surrounding environment due to siltation, waste slumps, etc.

(e) The position (4.09) is that guidelines will be set up to assess plans for exploration, development and reclamation and, in fact, guidelines are now in effect in the Coal Mines Regulation Act, the Surface Reclamation Act, and by authority within the departments concerned. Basic guidelines are acceptable and desirable in order to let the regulatory agents and the operator know what is to be accomplished. However, these guidelines must be practical and acceptable to all who must work within them. As a result it is strongly recommended that industry be given the opportunity to express their opinions and experiences on the draft versions of regulations or guidelines before any such material is made law.

SUMMARY

McIntyre has taken steps in the past and will continue to do so in the future, to limit the effect of our activities on the environment of the Grande Cache, Smoky River area. Some things must change during mining so that the land may not return to its original contour, but what we will do is to leave the land in an ecologically stable state so that birds, animals, fish and vegetation can live where we have mined.

Comments have been made on the position taken by the Department of the Environment. It is hoped that these will be taken as constructive comments and considered when the final draft of the regulations or guidelines are written.

In closing, McIntyre would like to recommend that a central library or source of information be set up to accumulate facts on the results of reclamation and preventative work done in the Western Province. A source such as this would be available for all the operators to help eliminate duplication of efforts and errors. McIntyre would be pleased to contribute the documentation on any work that is done in the Grande Cache area, and we would expect most companies to do the same.

In addition to the work done in co-operation with the regulatory agents, McIntyre has funded a project with the Research Council of Alberta in which McIntyre will be assisted in defining possible environmental problems that may arise in the Smoky River area. Once these potential problems are established, research work will be done on the solutions of any areas of concern. Within this project, programs are underway in the areas of groundwater, surface and drainage water, re-vegetation and slope stability.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

You made reference to the monitoring of water quality that is being done by McIntyre and it might be interesting to the audience and to ourselves if you were to elaborate on that.

MR. T.L. BEDARD

We are testing for siltation load caused by ourselves, pH, iron content and generally all the major factors that are in the water in the river. We have been taking samples above the mine site and below the mine site.

DR. WALTER TROST

In your siltation test can you distinguish between siltation from coal and siltation from non-coal materials?

MR. T.L. BEDARD

Siltation from coal would be carbon; siltation from non-coal would be something else.

DR. WALTER TROST

Do you distinguish, in your tests?

MR. T.L. BEDARD

I believe we do, yes.

DR. WALTER TROST

Do you also measure the rate of run-off, rate of flow of the streams on a seasonal basis and make comparisons with rates of flow on a seasonal basis anterior to the disturbance?

MR. T.L. BEDARD

We have not measured the flow of the Smoky River itself. There are no streams flowing into the Smoky other than Sheep Creek which is on the other side of the mountain. We are now becoming involved in the Sheep Creek area and we will begin to monitor this in conjunction with the Research Council of Alberta.

DR. WALTER TROST

So far you haven't been able to make any measurements on the quantity of water that may be involved or rate of flow?

MR. T.L. BEDARD

We have been measuring the quantity of water that has been flowing from the mine site into the river. We have not been measuring the quantity of water in the Smoky River itself.

DR. WALTER TROST

You made some statements in your brief resisting the proposition that mineral leases could be cancelled, under any circumstances. In your view, then, would a stop order authority be a preferable way for the public to be protected against bad use rather than the cancellation of the mineral lease?

MR. T.L. BEDARD

I assume by that you mean stop mining until you solve your problems. I feel that it would be more acceptable but I wouldn't say that I would accept it in total.

DR. WALTER TROST

Do you think the government should have any control?

MR. T.L. BEDARD

I feel that there should be some control within reason.

DR. WALTER TROST

In resisting public hearings, you used the costs of public hearings as your principle

reason for opposing them. Does the company bear the cost of public hearings?

MR. T.L. BEDARD

They are bearing the cost of my time here. They are bearing the cost of the preparation of the brief, and by the number of industry briefs in here I think there has been a lot of money spent on it.

DR. WALTER TROST

Is it cost that mitigates against the benefits of public hearings?

MR. T.L. BEDARD

Yes. I think more important is the time involved. I think it would be better spent on trying to solve the problems. I see several of the people from regulatory agencies who have been helping us and from the Research Council. I think this time would be better spent on the problems we are having.

DR. WALTER TROST

It is the cost of your effort and time that makes you oppose them; there is no other reason ancillary to that?

MR. T.L. BEDARD

No.

DR. STUART SMITH

In the very early part of your brief, in reference to public hearings, you use the alternate method of the regulatory agencies that have the operators exploring the problems and suggesting solutions. Do you not think the public should have some input or some stake in their own resources in making a decision? You stated that the regulatory agency and the company should decide whether or not the lease should be issued. In other words you might exclude a certain area, but should not the public be involved in that?

MR. T.L. BEDARD

I feel that the public would be intimately involved because of the regulatory agencies. I know in our dealings with them they do consider what other people would be thinking and what other people would be using. I have also recommended in this that if they felt fit they would contact an individual group for their opinion. It is looking for public opinion through the discretion of the regulatory agency rather than just broad-scale come one, come all.

DR. STUART SMITH

Do you think that our resources can be safely entrusted to government and industry without directly involving public.

MR. T.L. BEDARD

Yes, I feel so.

3.15 A submission to the Environment Conservation Authority
regarding the practice of strip-mining in Alberta

Submitted by
Mieczyslawa Gawlak
9744 - 65 Avenue, Edmonton

December 17th, 1971

This submission is not a well researched and well documented brief outlining the desirable practice of strip-mining. However much I would like to present such a brief, the nature of my employment did not give me an opportunity to use my time for the necessary study. The spare-time evening reading produced very limited results over a period of one month – the time between the announcement of hearings and the holding of them.

Introductory
remarks

Hence this submission is what the means at my disposal allowed it to be: a general statement of philosophy which, I think, should govern the formulation of the proposed strip-mining legislation. It is also an expression of grave concern for the environmental effects which result from inadequate restoration of the disturbed areas.

I recognize, that sharing of the available resources must become, and is becoming, an accepted policy of governments, organizations, and individuals throughout the world. Hence – even if our collective-governmental, and private-corporate greed allowed us to do it – we in Alberta cannot refuse to mine our coal when it is urgently needed in other parts of the world. But we can and must

insist that while supplying energy to others we do not degrade our own environment.

Of course, the proper reclamation procedures will add an extra cost to the mining of coal and hence, to the price of it. But this is as it should be. The users of the resource should be required to pay the full cost of its extraction. The reclamation of the disturbed landscape is an integral part of this cost.

The detrimental environmental effects of strip-mine operations have been demonstrated on a frightening scale in USA. As the result of this, two counties in Kentucky outlawed strip-mining altogether.

Restrictive strip-mining legislation

The state of West Virginia enacted 2 year ban in 22 counties. Efforts to ban it in the remaining 33 counties are gaining support. Strip-mine operators in Ohio are required to restore the reclaimed land to its original contours. Proposed federal legislation in USA requires all states to set reclamation standards within 2 years (1). The government of Canada recognizes the need for environmental protection and is presently introducing the protective measures for the Yukon and the Northwest Territories.

I am glad that our government in Alberta is taking the necessary legislative action to set the desirable standards for strip-mining operations here. I wish to urge the government to set the standards high. For the values which these standards will protect is the value of clear, clean water full of life, the value of green forests full of animals and

biological or physical in nature. Thus areas particularly vulnerable to disturbance, those particularly valuable because of their biological uniqueness, and those of beauty and rarity should be preserved and protected completely not only from strip-mining but from all exploitation whatsoever.

Exemption
of special
areas

We all realize that the coal deposits will serve the teeming humanity only for a limited number of years, after which they will be exhausted.

A substitute source of energy will have to be found. Nuclear energy is already available. I am quite confident that ingenuity of man will be able to harness the inexhaustible thermal energy of sun, and equally vast energy of the atmospheric jet streams. The latter is already under active investigation by soviet scientists (2). Therefore, it does not matter in the least, if our protective mining exemptions shorten the coal-energy era by a year or two. We will have a substitute in time. But, try as the clever man will, he will not bring forth a substitute for even the tiniest of the alpine flowers once erased forever by our human activity from the pattern of life.

Planning
of access
roads and
excavation
sites

I wish to draw the attention of the future legislators to the importance of planning and of execution of access roads, campsites and excavation areas. A very sad example how the access roads should not be built exists already in Swan Hills. (The illustration of it is attached to this submission). Let us not repeat the disaster again in the Rocky Mountain Foothills.

Owing to the vastness of coal deposits in Alberta it is important

Informed
and broad
base for
legislation

to recognise from the start the magnitude of the future coal mining operations. The area in question is also located in our most prized recreation zone, and in our wildlife production area. Hence the legislation to protect this area must be prepared with the utmost care and after a thorough study. The legislators should seek the support and opinion of soil erosion experts, ecologists and wildlife service scientists before drafting the legislation. Full knowledge of all the implications of strip-mining is necessary before the effective controls can be imposed.

Granting
of mining
permits

I think it very important that the procedure of granting of mining permits be reviewed as soon as possible. The issuance of a mining permit should be effected by a body which will weigh not only the economic advantages of the mining operation but in equal measure its environmental impact and its environmental desirability.

It is erroneous and misleading to translate the effects of strip-mining into the number of acres which are, or may be, covered by the operations. It is even more frustrating to see it expressed as an insignificant fraction of the total land area. Thus, the expected land area in Alberta to be affected by strip-mining is only to amount to 0.02 per cent of total (3). A recent survey on mining in Canada (4) estimates that only 0.006 per cent of total area of Canada will be affected by mining by 1975. Such representation is misleading to say the least. It implies a complete insignificance of the mining operations. It does say nothing of silted streams and lakes, of water polluted by acid wastes or washery

Plea for birds, and the value of the miracle of life itself. While we allow our
high strip- coal deposits to be used for the benefit of Japanese or European industry,
mining and for the monetary gain of the mining company shareholders, we must
standards insist that our share of the bargain is more than 10¢/tonn. This share
for Alberta must include unpolluted water, undiminished wildlife, and completely
restored landscape.

Need for The reclamation must be effective and complete. Effective to
effective prevent the loss of soil and to prevent the siltation and pollution of all
water bodies. The completeness of reclamation must mean blending of
the excavation pits with the surrounding countryside, covering the
reclaimed surface with top soil, and revegetation with the original plant
and tree cover. It is important that top-soil be saved for use in
reclamation. It takes nature at least 2-3 centuries to build up 1 inch of it.
Effective plant cover can be maintained only on organic soil. Only
then the natural productivity of the area will be restored in a matter of
20-50 years instead of 2-3 centuries as may be the case when the organic
soil has been removed.

Areas which due to their nature or location cannot be
reclaimed effectively must be excluded from the practice of strip-mining.
The same must apply to areas of special value be it ecological or aestetic.
A no-disturbance safety margin must be created around all streams and
lakes to prevent siltation. These exemptions must be insisted upon to
protect the irreplaceable features of our environment. These may be either

Misleading representation of strip-mining effluents, of destroyed aquatic life in these water bodies, of pollution for hundreds of miles downstream from the mines. Eroded hill-side does not provide a home for countless creatures which otherwise would have lived there. Disturbed water tables effect vegetation and animals far beyond the denuded area. The percentage figure is silent about these things. It is significant here to note that the same survey (p. 24) also states that of total 35,000 acres disturbed by coal mining operations in Canada to 1969, only 2,000 acres have been reclaimed.

New environmental awareness in industry Although some representatives of mining companies may view the demand for environmental protection with dismay, a new environmental awareness is awaking in industry in general. This new consciousness makes the industrial operators look beyond the pages of their account books to see that there is an intricate link -other than monetary- binding their operations to the living world. This new consciousness is exemplified well in the policy and practice of Basin Electric Power Co-operative, Stanton, North Dakota (5). The company which uses coal to generate electric power tried their utmost to reduce the adverse effects of their operations on the environment. They have impounded the plant ashes in a lagoon, though no state anti-pollution law existed at the time their plant was built. They supported the enactment of the North Dakota model anti-water pollution law in 1967. They researched improved ash removal techniques, they found a useful outlet for their fly ash, a waste. They add 0.75 per cent to their annual fuel bill by requiring the coal supplier to grade the spoil banks to

the contours of the rolling countryside.

I hope that this new awareness will make the mining operators
to
not only willing & accept the protective legislation but also give it their
wholehearted support in its execution.

References:

1. E. Groseclose. Wall St. Journal 1, 14, May 24, 1971.
2. Anon. Air-ships and windmills: power in the sky. New Scientist
and Science J. 50 (747): 90, April 8, 1971.
3. Prospectus on the environmental impact of surface mining in Alberta.
Environment Conservation Authority, Edmonton, November 1971.
4. F.T. Rabbits, G.N. Banks, L.L. Sirois, C.S. Stevens. Environmental
control in the mining and metallurgical industries in Canada. National
Advisory Committee on Mining and Metallurgical Research, Ottawa,
Jan. 1971.
5. J.L. Grahal. Conservation in the use of coal. Public Power 28 (5):
13-15, May 1970.

3.16 INTERDISCIPLINARY COMMITTEE FOR ENVIRONMENTAL QUALITY

PRESENTED BY DR. E. E. DANIEL

BRIEF TO ENVIRONMENT CONSERVATION AUTHORITY ON THE
ENVIRONMENTAL IMPACT OF SURFACE MINING IN ALBERTA

I. Dissatisfaction with Arrangements for this Public Hearing

The university Interdisciplinary Committee for Environmental Quality (ICEQ) appreciates this opportunity to present its views on the problem of the environmental impact of surface disturbances in Alberta. The importance of providing public hearings on matters seriously affecting our environment cannot be overemphasized. We strongly support the right of people to be informed about government actions affecting the environment, to express their opinion about such actions and to participate generally in decisions regarding the environment. However, for such hearings to be more than token events, there must be adequate dissemination of relevant information sufficiently in advance of the hearing so as to allow citizens the opportunity to present thoughtful, well-researched and well-constructed briefs. There was adequate time and some advance information provided by the E.C.A. for the hearing on water diversion from the North Saskatchewan River to the Cooking and Hastings Lakes. As a result many useful and innovative briefs were presented.

There has been neither adequate time nor adequate advance information for the preparation of briefs on the environmental impact of surface mining. About a month elapsed between the announcement of hearing dates and the occurrence of the first hearing; a prospectus on the content of the hearing was issued with the announcement by the E.C.A., the Consultants'

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report on the subject appeared at the first day of the hearings and the summary prepared by the Department of the Environment to outline the philosophy, concepts and principles around which legislation on surface reclamation is to be developed was available only two weeks before the first day of the hearings. Both the Consultants' report and the summary prepared by the Department of the Environment raised questions, different in each case, which must be answered, and some of these will be raised below. Moreover, the summary supplied by the Department of the Environment is obscure in a number of areas and it would seem impossible for the public to obtain answers or clarification in these matters as no members of government or civil servants will be here to provide further information.

Important background information has not been included in the materials distributed prior to the hearings. There is little information on the present surface mining operations in Alberta. The number, location, extent and terms of leases for surface mining are not available and no assessment of environmental impact of these activities has been provided. No evaluation of the particular problems of surface mining in Alberta, especially in the Foothills or Mountain regions is available. No cost-benefit analyses of the previous or present surface-mining operations in Alberta are available. No summary or assessment of existing planning, control or enforcement procedures is available. Even the Consultants' report omits documentation in support of the many points contained in it and hence its statements cannot be verified.

Perhaps the intent of the hearing was to provide a forum only for

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those who had previous knowledge or for those who had preformed opinions, irrespective of knowledge. If not, the present hearing arrangements are inadequate and defeat the purposes as we understand them. We urge that future hearings be held with provision of sufficient advance information and time. Owing to the dearth of specific information, our brief will concentrate on organizational aspects proposed in the Consultants' report and supplied in the summary statement by the Department of the Environment.

II. Positive aspects of the Proposals

A. Environmental Impact of Surface Coal Mining Operations in Alberta.
F.F. Slaney & Company Limited. Consultants to E.C.A.

We strongly endorse the following points appearing in the Consultants' report.

p. 14. Pre-planning holds the key to success in controlling and minimising environmental damage resulting from resource exploitation. The desirability of developing a land use plan for the entire Foothills and Mountain region is therefore obvious. Land management zones should be delineated as suggested, (p. 45. See also McHarg 1969)* in order that other irreplaceable natural resources are not impaired solely for short term economic gain.

p. 25. The high capability of the Foothills region to provide recreational land suggests the need to plan mining activities and the subsequent reclamation in such a way as to enhance this potential.

We concur with the several suggested strategies for preventing

* McHarg, I. 1969. Design with nature, Natural History Press, New York.

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and minimising the impact of surface mining as detailed on pages 14-17 and 28-33.

p. 41. We agree that cost-benefit analyses can only aid in presenting the facets of the problem in logical order leaving a subjective decision to be taken regarding the social costs involved many of which are still immeasurable by existing techniques.

pp. 45-50. In general we approve of the proposed controls utilising a permit application accompanied by a detailed management plan to be followed by regular inspection and monitoring to ensure compliance with the approved plan. We see the performance bond as an essential tool in the enforcement of any such regulated controls and recognise that the inspection and enforcement mechanisms will be those which will determine the effectiveness of any revised legislation. In connection with the procedure for permit application we would like to see an additional phrase on p. 48 viz. Notice of intention to apply for a permit should be given (appropriate publicity) and the contents of the application made known to the public.

Concerning the performance bond we would wish it to be mandatory and subject to forfeiture in the event of non-compliance with the permitted operating conditions.

p. 22. We would draw attention to a seeming underemphasis in the section dealing with key wildlife habitat areas. Whilst it is true that some 'replacement' habitat could be provided in alternative areas of the province the vital habitat for the few already endangered species is irreplaceable. Those responsible for reviewing plans should be aware

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of this and accept the need for inviolate areas to be designated in order that highly vulnerable species may be conserved.

p. 51. The recommendations for further studies in the Consultants' report should be acted upon. In connection with the second of these it might be suggested that the Research Council of Alberta should undertake a program of studies to determine the best reclamation methods applicable in Alberta, including investigation of the problems involved in disposal of fines and ash (p. 13).

One additional recommendation should be the commencement of a study to develop a total land use plan for the western region of Alberta. This should be started without delay in view of the growing recreational pressures upon the mountain parks. Alternative sites for recreational parks are available in the foothills and these should be developed in conjunction with the mining activities, both planned and existing.

B. Department of the Environment Statement on Proposed Legislation Concerning Surface Disturbance.

We fully support several statements contained in this document, particularly those concerned with:

1) the need for comprehensive environmental planning (pp. 2 and 6-7) based on approved guidelines before any form of resource exploitation commences,

2) the principle that it is the responsibility of the resource user to identify the nature and extent of possible damages and prove to the resource manager that no irreparable damage has occurred or that appropriate corrective action has been taken (pp 2-3).

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3) Section 4.062 (p. 6) provides that a review of development proposals should occur, not only before the beginning of resource extraction, but also before issuance of an exploration permit. We regard this as an essential feature of any new legislation. The Slaney Report (pp. 6-7) points out that the area likely to be affected by exploration activities in the Mountain and Foothills regions is much more extensive than that affected by extraction operations and that the consequence of uncontrolled exploration activities can be severe and irreversible.

4) the provision that reclamation proceed simultaneously with operations (p. 6).

5) the provision for a financial security deposit to ensure satisfactory compliance with any approval for reclamation and subject to forfeit (p. 7).

6) the provision of fines and prison terms for convicted violators of the act (p. 8).

These principles and proposals provide a solid basis for preparation of an effective system of control of surface mining or other activities damaging to land. However, there seem to be serious questions arising from the principles as put forward in both the Department of the Environment Summary and the Consultants' Report.

III. Problems and Unanswered Questions

A. The Slaney Report

1. Review (Planning) and Enforcement

The diagram entitled "Control of Environmental Impact of Surface

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"Mining" makes clear the dilemma. Although provision is made for inspection and monitoring of operations, there is no mechanism indicated for enforcement of the provisions of such plans, only for their amendment in the event that unforeseen circumstances arise. Presumably failure to comply with the management plan could result in forfeiture of the bond held by the Reviewing Body, but the inspection and monitoring agencies report to government - not to the Reviewing Body. This may subject the interpretation and transmission of such data to political pressure.

Lack of any clear or specific recommendations on monitoring and enforcement is a serious weakness of the report. The comments made below on this subject in relation to the Department of the Environment Summary (pp. 7-9) apply equally here.

In this connection it is worth pointing out that the more detailed the Management plans required, the less connection and liaison may be necessary between the monitoring and enforcement agencies and the Reviewing Body. However, none of these considerations are examined in the Consultants' report.

B. Department of the Environment Summary

1. Planning and Enforcement

No matter how worthy the principles on which it is based, a legislative act is ineffective unless appropriate provision is made for its operation and enforcement. The statement contained in the Department of the Environment Summary (pp. 3-4) is extremely vague on this point, viz. "The proposed legislation would encourage participatory planning by delegating responsibilities to those departments or administrative agencies of government or municipal governments to ensure the most effective application of the statute and enable the administrative unit with the required expertise and capability nearest to the problem to share in the planning and execution process."

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An appropriate planning body should be interdisciplinary in character to encompass the range of problems associated with any land use proposal. It should have some permanence in composition to allow accumulation of experience and some flexibility to allow for any special inputs which may be required. It should be free of day-to-day political pressure, and operate under general policies laid down by government. In this regard the proposal of the Consultant for the establishment of a Reviewing Body seems reasonable. We fear that the Department of the Environment proposal would lead to fractionation and inconsistency in planning, rendering it susceptible to local and immediate pressures. Application of general policies would then be difficult if not impossible.

Above all, the Department of the Environment proposal fails to make clear where the responsibility for enforcement will lie and seems to imply that planning and enforcement will be carried out by the same, but diverse, groups in various instances. This arrangement suffers from similar disadvantages to those already described in respect to planning. It is not clear that planning and enforcement can best be carried out by the same bodies, and this should be given further consideration.

There is considerable confusion over planning and enforcement methods which is exemplified by comparing the section considered above (see Department of the Environment Summary pp. 3 and 4) to the section entitled "Consolidation of All Activity Phases and Sequences" (pp. 4-5).

This states : "It is intended that a program of activities including the entire series of sequences be regulated in context. In addition, the administration would be interdepartmental to such an extent that unilateral departmental or single disciplinary action could not occur."

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This could be taken to mean that the planning and enforcement procedures would be so fragmented that nothing effective could be accomplished; that planning and enforcement would be carried out by a variety of ad hoc groups, composed of people with other major responsibilities. The nature of the administrative arrangements for planning and enforcement are frighteningly vague and confused.

In our opinion, there is a need for a separate, interdisciplinary, permanent (at least in part) planning and review body and a similar body should be formed for enforcement purposes. Adequate liaison should be established between these bodies and they should operate semi-autonomously subject to general government policies. Their activities should be open to public scrutiny and review.

2. Role of the Public and Public Hearings

The Department of the Environment Summary makes it mandatory

"that specified resource allocation developments of an irreversible nature could require public debate in the Legislature and that other developments would require public hearings to expose the full nature of their environmental impact before action proceeded."
(p. 3, par. 2.6, line 3).

The first part of the statement seems to imply that resource allocation could not proceed via orders in council and would have to be debated in the legislature. This is surely an advance and allows these matters to come under public scrutiny, but it seems also to imply that public hearings would be precluded in such cases and confined to the "other developments" which presumably do not involve resource allocations of an irreversible nature. (it is not clear whether irreversible in this

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context implies allocation of non-renewable resource or allocation in perpetuity). The problem may be semantic, but in our opinion public hearings should be possible, indeed mandatory, in relation to all important decisions affecting the environment.

3. A licence to pollute?

Section 2.4 (p. 3) of the Department of the Environment Summary indicates that the proposed legislation would, in some cases, require the resource user "to bear the financial cost of replacing or recreating alternative features or compensating society in the form of a financial assessment paid to the Government for the irreparable loss of the feature."

Such a clause, unless further clarified could mean that if replacing or recreating environmental features is impossible, the resource user may be allowed to destroy for a fee; this would constitute a licence to destroy the environment.

4. Retroactive application of the legislation and reclamation of derelict land

Section 4.11 (p. 7) of the Department of the Environment Summary suggests that a retroactive feature of specified length be incorporated. We urge that derelict land be reclaimed and that if possible, the resource user be made financially responsible. The possibility that such land could be reclaimed and developed for recreational purposes to relieve pressure in the national parks should be given careful study.

Brief to E.C.A. on Surface Mining in Alberta

IV. Summary

Our principal concerns can be restated thus:

1. A lack of precise and readily available information.
2. Insufficient time for the preparation of competent briefs.
3. Support for most of the principles enunciated in both the Consultants' report and the Department of the Environment statement.
4. Criticism of the apparently weak enforcement procedures proposed.
5. The lack of clarity in defining the relationship of the agencies responsible for planning and review to those concerned with inspection and enforcement.
6. Proposed legislation which could be construed as a licence to damage irreplaceable natural features.
7. Absence of a clear commitment to reclaim derelict land and to institute a retroactive clause in the new legislation.

E. E. Daniel, Ph.D., Coordinator
Interdisciplinary Committee for
Environmental Quality (ICEQ)

December 17, 1971

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

On Page 9 of your brief you commented on the need for a separate interdisciplinary permanent planning and review body and a similar body for enforcement purposes and that their activities should be open to public scrutiny and review?

DR. E.E. DANIEL

Presumably there will be data collected by the enforcement agency in respect to time and degree, and quality of compliance. These data, in our opinion, should be available to the public. We in general support the view that the public should be allowed to sue and take appropriate legal action in respect to guaranteeing compliance in the event that the government fails to insist upon it. In other words we regard these resources as belonging to the public and that the public should have a chance to have the information about compliance and to take action to compel it.

DR. STUART SMITH

Are you suggesting that the mechanism be similar to that now employed in the United States with the filing of an environmental impact statement and the subsequent actions?

DR. E.E. DANIEL

Precisely. When we state that there should be mandatory public hearings, we believe that these should involve adequate advance information. We have in mind something similar to the filing of an environmental statement before a permit, either to explore or to operate in respect to natural resources, is granted.

3.17

A CASE FOR THE BIGHORN SHEEP

by

CHARLES LACY

WILDLIFE BIOLOGIST

HINTON, ALBERTA

INTRODUCTION

The eastern slope of the Rockies in Alberta is well-known throughout the world for its big game resources. Alberta is particularly well-known for its very large bighorn rams (Figure 1). For those interested in evaluating everything in dollars and cents, non-residents harvest about 100 rams annually and collectively spend about \$5000 for each ram taken (Calculated from Annual Reports, Department of Lands and Forests). Provincial biologists have estimated the total number of bighorns outside of the National Parks at around 4,000 animals (Wishart, pers. comm., 1971). Although Alberta has the most bighorns of any state or province in North America these numbers are relatively few compared to other big game animals in the province such as deer which are estimated at over 200,000 animals (Webb, 1959).

WINTER RANGES

The factors that limit the numbers of mountain game, particularly bighorns, are very restricted winter ranges. Their requirements are very specific, i.e., a grassy slope in close association with escape terrain. The winter ranges are generally of two types.

The first type is the wind swept slope with the slope generally facing west and the escarpment on the east. At this time of year there are large tracts of snow covered mountains with the occasional bare vegetated slope showing through (Figure 2).* Through the centuries sheep have located these unique patches of terrain and

return each year to survive the winter. Sheep are not adapted to deep snow and consequently are trapped in these small snow free pastures by the winter environment (Figures 3 and 4).*

The second type of winter range is the south facing slope which is kept clear by a combination of sun and wind (Figure 5). This type of winter range is generally more productive vegetatively and as a rule supports larger numbers of bighorns than west facing slopes (Figure 6).

According to the Fish and Wildlife Branch there are approximately 70 of these topographic and climatically unique winter areas along the entire east slope of Alberta. They vary in size from a few acres to a few square miles. In aggregate the total area would amount to less than 200 square miles. The known winter ranges are approximated in red on the following Coal Lease Maps which are available to the public from the Department of Mines and Minerals.

COLEMAN (Map 1).^{*}

In the extreme south, most of the bighorn ranges are away from the freehold or lease areas and are located just north of Waterton Park. Nevertheless, it is down there that we get a view of the devastating results of strip mining, e.g., Racehorse Creek area north of Coleman (Figure 7).*

HIGHWOOD (Map 2).^{*}

On this map it appears as though two out of six winter ranges could be damaged (Forget-Me-Not) or wiped out (Windy Point).

Windy Point is a classic bighorn winter range with good grass cover on both the west slope and south slope and essential escape terrain in between (Figure 8).

CANMORE (Map 3)*

More ranges appear to be in danger of destruction in this area than most other areas. The problems that will develop here will have National significance since most of the ranges are wintering grounds for sheep from Banff Park (Banfield, 1958). Those of us who are aware of the significance of the alpine big game winter meadows on the Dogrib and the Ya Ha Tinda, for example, are naturally disturbed at what has taken place there with respect to exploration and mining.

In the Canmore region there is one good example of where mining has had no adverse effect on bighorn ranges, i.e., Ribbon Creek (Figure 9). This area was mined underground and below timberline several years ago with considerably less technology than today and the bighorn ranges remain intact. There is a sizeable sheep herd that still survives in that area today.

NORDEGG (Map 4)*

Again more ranges appear to be in danger particularly on the Ram River and on the north end of the Ram Mountain. On the other hand, Nordegg itself is another example where mining below timberline has allowed the industry and bighorns to co-exist (Figure 10).

LUSCAR (Map 5).^{*}

The winter ranges here also have National significance since they provide the forage necessary for the survival of large numbers of Jasper Park sheep. Once again coal mining below timberline has not adversely affected the existence of bighorns over these many years (Figures 11 and 12).

SMOKY RIVER (Map 6).^{*}

This area, some of which was once designated as a Wilderness Park, is where we get a glimpse of what is to come. I am sure the Company at Grande Cache (Figure 13) would wish to be good corporate citizens, but what frightens those of us with interest in wildlife is what was once a fine piece of game range (Figure 14)^{*} has been thoughtlessly scarred for no apparent benefit to anyone immediately above their plant (Figure 15).

Some important game ranges which are beautiful alpine meadows in themselves such as those on Copton Ridge and Caw Creek Ridge (Figure 16) have been explored and are about to be desecrated (Figure 17)^{*} in a manner much like the forested ridges in southern Alberta (RRCS Report, 1970). Obviously, the impact will be less on a few billion trees than it will be on a few hundred bighorns.

The irony of Alberta's mountain coal can be illustrated in one picture (Figure 18)^{*}. On the left we see a Japanese motor vehicle smelted with coking coal from Alberta mountains. On the right we see a bighorn lamb which is also a product of our mountains. If we must sacrifice one for the other, I personally prefer to sacrifice the

Japanese motor vehicles for bighorns. However, in this day and age I am sure it is possible to have both, provided key winter ranges are not strip mined.

CONCLUSION

The ease of stripping a thin overburden of alpine meadow from a coal seam may be the least costly for a coal company, but it could cost Albertans and Canadians a great deal. To my knowledge, no disturbed tundra or alpine zone has been successfully restored to its original plant community.

In the case where overlap has occurred between coal interests and alpine winter ranges for game, I urge the Department of Environment to require the operator to use underground mining methods and where this is not feasible the Department of Environment should remove, buy back or expropriate that portion of the lease and "let it be".

* Maps and figures are not published with these proceedings, but are available in the Information Centre of the Environment Conservation Authority.

REFERENCES

- Banfield, A. W. F. 1958. The Mammals of Banff National Park, Alberta. National Museum of Canada. Bulletin No. 159, Ottawa. 53 pp.
- Renewable Resources Consulting Services Ltd. 1970. An investigation of coal exploration operations at Grande Cache, Alberta. 60 pp.
- Webb, R. 1959. Alberta's big game resources. Queen's Printer, Edmonton, Alberta. 31 pp.
- Wishart, W. D. 1971. Personal communication.

QUESTIONING BY THE AUTHORITY

DR. STUART SMITH

This isn't concerned so much with the total elimination of the range which you showed, but rather with the exploration roads and the access they provide. I wonder if you would care to comment on the possibility of over-use of these roads by either hunters or viewers or the general aspects of increased access on these animals.

MR. CHUCK LACY

This is very definite; not a possibility. Unless something is done by way of management of this resources to control access to the ranges. Personally, I can say it is a fact that some of the things we find out west are deplorable from a standpoint of the effect on the environment.

3.18

BRIEF TO:

ENVIRONMENT CONSERVATION AUTHORITY

ON

SURFACE MINING IN ALBERTA

EDMONTON NATURAL

HISTORY CLUB

December 17, 1971

The Edmonton Natural History Club has a membership of approximately one hundred and thirty dues-paying members. The membership consists of concerned citizens of all walks of life including professional people of many different disciplines. The age range is from pre-teen to retired individuals.

With respect to strip mining, the Edmonton Natural History Club appreciates the opportunity afforded by the Environment Conservation Authority to place its collective opinions on record and at the same time to listen to the arguments presented by other groups who may have similar or contradictory opinions.

This brief is intended to be brief. If any of the points presented are worthy of adoption, details can best be worked out in committee.

The Edmonton Natural History Club accepts without reservation the position statement of November 19, 1971 prepared by The Department of The Environment.

Providing the philosophy respecting surface disturbance can be expressed in legislation and providing the present and future governments of this province can enforce the legislation in a competent manner, 'the cultural,

scenic and aesthetic deterioration of the land surface' as described by Section 4.103 will NOT be the inevitable result of the development of the non-renewable resource.

The Edmonton Natural History Club offers the following six points to implement the philosophy of the position paper, -

Point One: Grass root responsibility

Much unnecessary damage to the environment occurs through

- a) The ignorance of consequences
- b) Carelessness

of heavy equipment operators working in isolation from supervision.

As a positive approach to needless damage by heedless operators, it is recommended that machine operators, sub-foremen and foremen be enabled to earn a 'Ticket of Competence' with respect to non-damage. This ticket could be earned in a manner analogous to a first-aid certificate. Such tickets should have a recognized value, i.e., as preference for employment, a slightly higher rate of pay or an added qualification for

promotion. It is sufficient to state that the details of such training should be correlated with a workman's daily work and interests.

Point Two: Government responsibility for research and personnel

With respect to emphasis on (Section 2.2) reclamation proceeding simultaneously with production in order that the period of disturbance would be limited and in order to make planning before the fact (Section 4.07), much research will be required. The research, planning and implementation of planning will create a demand for manpower skilled in the environmental sciences.

The necessary research and the training of personnel cannot be accomplished overnight. A few years from now the coal industry will be demanding personnel with environmental know-how. It will be difficult to recruit people trained under Alberta conditions unless the Government of Alberta fosters academic training and practical research.

Further, under Section 2.3 with Responsibility for Action on the Resource User, unless the Government has accumulated a large mass of unbiased research data and also the personnel to interpret data submitted by coal operators, the resource manager will not be in a strong position to accept or reject proposals from prospective resource users.

The cost of research and training of personnel should be a levy on present and future coal production on the principle that the resource user bears the financial cost of restoration. This "cost" may be a prime example that a "cost" may be an "investment" resulting in benefits to the industry, as indicated in Section 2.4.

Making available to the coal operators the results of research by Government agencies is not to be construed as contrary to the responsibilities of action on users as described in Section 2.3.

Point Three: Pre-employment training for Environmental

Personnel:

I) University Level:

Future trends are probably being predicted now so that the Universities of this province will be able to train personnel who in due course will be qualified to be licensed as Professional Environmental Engineers.

II) Post Secondary Level:

In order to develop the interdisciplinary viewpoint between technicians, post secondary institutes should be called upon to develop courses at various levels as follows, -

A. Courses in diesel mechanics, heavy duty equipment and civil engineering should include training in erosion, silting, forest cover, soils, seeding and other environmental topics suitable to the standard of training of the basic course.

B. Courses in the biological sciences should include such practical aspects

of engineering as methods of dirt moving, stripping and replacing of top soil, installation of culverts, drainage of roads and trails, catch-water ditches and control of erosion.

C. To develop a mutual area of thought, some students in the biological sciences and some students in the engineering sciences should sit together in the same classrooms under the same instructors. For example, courses in interpretation of aerial photographs would be an excellent opportunity for the meetings of minds.

D. In making reference to post secondary training, it is not suggested that cat skinners become botanists or that botanists become cat skinners but at all levels of training there can be mutual interests.

Point Four: Resident inspectors

Just as a Government highway contract calls for a resident engineer, so should a coal mining company be prepared to accept a resident environ-

mental engineer. Such an officer would be in daily contact with all phases of the operation and through the proper chain of communications the Minister responsible would be kept aware of the progress of activities as outlined in Section 3.3.

Point Five: Information available to the public:

Public interest in environmental matters is increasing year by year.

In order that an enlightened public retain confidence in this and future Governments, it is strongly recommended that the Government of the day set up each year a commission completely independent of the Civil Service to make an annual report to the Legislature on surface mining. The personnel of this commission would be men of stature in the community with the requisite background of experience.

Since the tenure of office would be one year only, the public would have confidence that the members of commission would be free of bias.

The report of the Commission should be available to the public at a nominal cost and be available to the public prior to the opening of the Legislature.

Point Six: Stop clause in contracts :

All contracts between coal producers and consumers should by law include a clause that delivery of coal may be delayed, reduced or cancelled if the producer is unable to meet the requirements for reclamation and recovery. Government insistence on such a clause will focus attention on the requirement that the period of disturbance will be limited. (Section 4.07)

CONCLUSION: If further clarification of any of the above six points is required, the Edmonton Natural History Club would be pleased to comply.

THE EDMONTON NATURAL HISTORY CLUB

Per

G. C. Hamilton
G. C. Hamilton, P. Eng.

The Edmonton Natural History Club makes the following recommendations to minimize strip mining damage, -

- 1) Grass roots training of employees
- 2) Government responsibility to lead in research
- 3) Need for post secondary training to supply skilled personnel
- 4) Resident inspectors on every mining operation
- 5) Public to be kept informed
- 6) Drastic clause in producer/consumer contracts

For immediate release

3.19

RECLAMATION AND RECREATION

a brief
submitted to

THE ENVIRONMENT CONSERVATION AUTHORITY

PUBLIC HEARINGS ON
THE ENVIRONMENTAL IMPACT OF SURFACE
MINING IN ALBERTA

Edmonton, Alberta - December 17th, 1971

G.R. Shelley
MACROPLAN CONSULTANTS LTD.

Mr. Chairman, Members of the Authority, ladies and gentlemen:

My concern, and the concern of the firm that I represent, is with optimum resource use, development, protection, and with related planning and legislation.

I believe that most of you will agree that the question to which we seek an answer is not whether we should halt all strip mining operations, but rather to what extent we should allow this activity and what controls should be imposed.

In particular, it is extremely important that we do not allow the destruction or deterioration of one primary resource base at the expense of another. As I see it, the major conflict in resource use and development is between renewable resources that cater to recreation and tourist activities and industries versus non-renewable extractive energy resource industries. There can be little doubt as to which of these two industries is the more important from an economic and from a resource user point of view. At the national level, it has been estimated that travel alone contributed 3.7 billion dollars to the Canadian economy in 1970, and this figure is expected to increase to 7 billion dollars by the year 1980. At the present time one and one-quarter million Canadians are employed on a full or part-time basis in travel and recreation jobs. The growth in tourism and recreation industries as measured in numbers, expenditures, and material development exceeds any other individual industry; for example, there was a 40 percent increase in the number of tourists in Canada between 1969 and 1970.

At the provincial level, tourism is expected to be Alberta's number one industry within a 10 to 15 year period of time. Tourists spent over 241 million dollars in the province in 1970, and the expectation is that this figure will increase to one billion dollars by the year 1985.

The relevance of the above statistics to strip mining and other forms of surface disturbance is obvious. We must protect the resource base, and at the same time develop and expand areas and facilities that attract tourists, travellers and urban users to natural areas in the Province. It must be recognized that the foothills and other scenic areas of the Province are primary locations for recreation and tourist developments. It must also be recognized that these areas are not unlimited in size and potential, or in their capacity to sustain diverse and often incompatible uses. While it is true that the Province is endowed with much undeveloped open space public land, it is also true that federal, provincial, regional and municipal recreation areas and facilities are presently suffering from overcrowding and overuse. Developments necessary to meet projected future recreation demands will require massive tracts of this undeveloped land. Alberta's foothills more so than other areas, contain the natural features and aesthetic and other qualities that are required to satisfy the recreative needs and interests of diverse user segments of the population.

The conflict between recreation and strip mining will exist as long as public and other lands have capability for both of these activities. Ideally, the objective should be to regulate the use of land resources so that only preferred activities or developments are approved and accommodated. There are, however, several criteria for determining land use preferences and this is certainly the case when evaluating strip mining as opposed to recreation land use.

From the standpoint of service, expanded recreation would offer direct and indirect benefits to far more Albertan's than would land use for strip mining.

From the standpoint of economics, it has been estimated that travel alone has an income multiplier of \$2.43 - each dollar of travel expenditure contributing \$2.43 to the gross national product. To demonstrate the economic multiplier effect of tourism, it has been estimated that 24 tourists a day in a specified area is equal to an industry or factory with a \$200,000.00 payroll.

From the standpoint of environmental damage, both strip mining and recreation can be serious offenders. There is no need to dwell on environmental damage resulting from strip mining operations since this problem has been well identified in earlier briefs. One additional point that should be mentioned, however, is that deterioration in the aesthetic qualities of the landscape is not limited to the mined-over area, but extends to the entire area of visual contact (in some cases this may be 20 miles or more).

Typical examples of environmental damage often associated with recreation land use are: overuse of areas resulting in soil compaction and damage to ground cover, destruction of natural areas and features to make room for the development of access roads and recreation facilities, encroachment into highly sensitive ecological areas, destruction or depletion of habitat elements necessary to the survival of certain flora and fauna, and the natural range of those wildlife species that retreat from areas frequented by humans.

The solution to recreation-related problems in scenic and natural areas has long been identified with the need for long-range planning and optimum resource development. Similarly, the solution to problems related to strip mining operations are identified with the need for reclamation. Although recreation is not compatible with strip mining, recreation is compatible with reclamation in the succession of resource use and development.

The reclamation of mined-over areas for recreation purposes is enhanced by existing roads and in some cases other services, i.e. water supply, sanitary facilities and parking areas. Unfortunately current reclamation practices are usually of a restorative nature - where the objective is to reinstate the earlier land form and surface features to the greatest possible extent; or of a minimal standard in nature - where the objective is to reclaim land only to the point of checking severe environmental damage, and to meet minimal provincial requirements and public complaints.

What is needed most is another type of reclamation known as functional reclamation. This is where post mining land potential and land uses are evaluated and considered in the final land design. This type of reclamation usually requires a comprehensive development plan in advance of mining operations. Slag piles, overburden and spoil banks, excavations, newly created water catchment basins, etc. are incorporated as pre-planned functional features in what will later be park and recreation areas. When this is done substantial savings to the mining company can be realized. Traditional reclamation methods, where the norm is to completely fill and level mined-over areas into flat open space areas is usually a much more expensive proposition.

In support of functional reclamation, it is important to point out that almost any land area can be adapted or developed for some type of recreation usage, and that variation in topographic features and unique land characteristics tend to enhance land values for recreation. Surface or strip mining operations produce an altered land form with this variation and uniqueness. Of course, functional

reclamation requires acceptable and safe slopes and heights for spoil and overburden banks, and erosion and pollution sources must be controlled. In addition, banks must be fortified and topped with nutrient matter that supports the growth of desired types and species of vegetation. The latter requirement should not be a severely limiting one, even in areas with poor natural topsoil. Peat moss is abundant and relatively inexpensive in bulk form in Alberta. Highly productive loam soils are stockpiled beside many major highway developments in the Province. The proper use and application of these nutrient bases can insure that every mining operation is succeeded by a green terrain that resists erosion from wind and surface run-off.

The challenge, as I see it, is to undertake reclamation projects that will result in highly aesthetic and functional landscape features.

In view of the tremendous tourism and recreation potential in our Province, and in consideration of the need to extract energy resources over large but concentrated areas that would normally cater to or adopt to recreation uses, I would offer the following suggestions:

Wherever possible reclamation planning should precede actual mining operations in the interests of insuring better future land uses and resource development.

Where the unity of natural elements has already been destroyed, possibilities in manipulating the liabilities of the altered landscape should be fully evaluated. The matrix of any reclamation project must begin with an analysis of landscape elements including slopes, edges, planes, masses, cover, voids, monotony, stillness, facades and colors. These elements are basic to all sites, and the design approach must take each into consideration in creating a new order in the land. For example, masses of overburden may be seen as sites that are adaptable to scenic overlooks and down-hill sports areas; voids created as a result of mineral extraction may be impoundments for water related recreation activities; pit facades present unlimited possibilities for enclosure, privacy, wind-break, noise insulation, and for the separation of activity areas.

The concept of reclamation for recreation is not new. Two of British Columbia's outstanding park areas, Butchart Gardens and Queen Elizabeth Park were developed in abandoned mine quarry areas. It is doubtful if the original land features in these areas could have been planned to produce a better effect had they never been exploited.

There are numerous other examples of areas such as gravel pits and strip mines being converted to productive recreation uses in North America. In the Harwood-Hazleton area of Pennsylvania where coal has been strip-mined over immense areas, reclamation plans have been completed and include an anthracite museum, scenic overlooks, incline trains for access to various levels, aerial cable cars, scenic walks, trails, automobile-oriented interpretive areas, restaurants and a host of other recreation facilities.

Within our Province, there have been few attempts to develop comprehensive recreation areas, facilities and services on mined-over rural lands.

In conclusion, new and effective legislation governing strip mining and other surface disturbances should not be entirely restrictive or punitive. Legislation should make provision for co-ordinated planning, exploration, development and reclamation based on long-range land use concepts and resource development. Co-operation between mining firms and all levels of government is required in all pre and post development stages. This type of co-operation by mining firms could result in new sources of revenue (commercial recreation enterprises), better public relations, and in an environmental identity. Benefits to all levels of government could be measured in terms of expanding the resource base necessary to meet present and future public recreation demands and needs. Finally, legislation and long-range planning should include provision for cost-sharing in reclamation programs, based on the benefits that would accrue to jurisdictional authorities and to the public as a whole.

QUESTIONING BY THE AUTHORITY

DR. STUART SMITH

Is it correct that you are suggesting a new and innovative approach to reclamation wherein a new land form may be as valuable or more valuable than the natural land forms that existed previous to mining and that this may represent a source of revenue, either to the crown or to the company that might own the land?

MR. GENE SHELLEY

This is definitely the case. The parks and recreation areas in the foothills areas and our national parks are overcrowded and over-subscribed. We know from trends and statistics that the recreation demand within our province will triple within eight of nine years. If we are going to meet this demand, we have to expand our resource base. If we are going to incorporate mined areas into the planning concept, we cannot look at restorative recreation and that is where the attempt is made to reinstate the previous landscape to the greatest possible extent. Many of these mining operations in the foothills areas would be ideal sites for camp grounds, picnic grounds, trailer parks, and that type of facility. These facilities are very much in need and they have done very well in that kind of environmental context.

MR. PAUL BABEY

You mentioned, twenty-four tourists are comparable to a company with a payroll of \$200,000.00.

MR. GENE SHELLEY

I wouldn't say that I am any kind of expert on Gross National Product but this is a statistic that has been worked out in the U.S. and it has been applied in some federal government studies in Canada that relate to recreation and tourism. It apparently is quite a valid one. Twenty four tourists a day will contribute as much to the Gross National Product, this is in any specified area, as a company with a payroll of \$200,000.00, and this is discounting local and regional use which I didn't comment on in my brief.

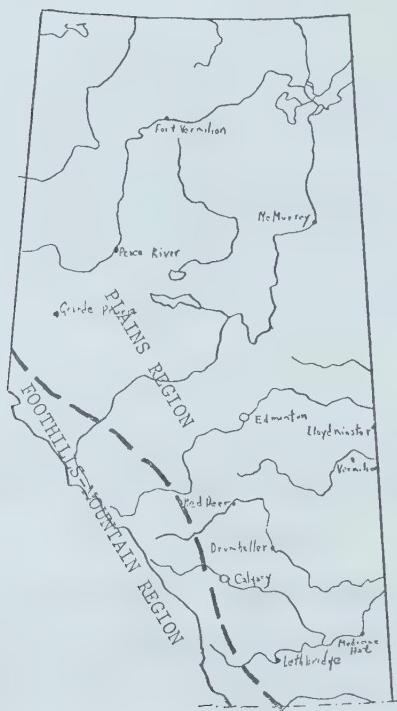
3.20

Brief presented to
THE ENVIRONMENT CONSERVATION AUTHORITY
on
**THE ENVIRONMENTAL IMPACT
OF SURFACE MINING
IN ALBERTA**

Presented at Public Hearings held in Edmonton, Alberta,
Dec. 17, 1971
on behalf of the
ALBERTA GEOGRAPHICAL SOCIETY
by
Ronald Whistance- Smith

BRIEF ON
THE ENVIRONMENTAL IMPACT OF
SURFACE MINING IN ALBERTA

PRESENTED BY THE
ALBERTA GEOGRAPHICAL SOCIETY



The concerns of the Alberta Geographical Society are twofold. On the one hand we wish to see resources developed to the greatest economic benefit of all men. On the other, we fear that economic advantage will not be seen to include the preservation of a good place in which to live.

Resource developers often come to Alberta from other areas. Once exploitation is complete, they leave, and often leave us with a downgraded environment, one which is no longer a part of their world of experience or concern. Because it is cheaper and easier to reclaim some areas than others, we have chosen to focus on the locational aspects of future surface mining operations.

This Province is in the fortunate position of having the majority of those resources which are mined by surface methods, distributed throughout the province. We can therefore choose, within the limits of demand, quality of the resource, and public acceptability, the areas which will be developed.

If we divide the Province into two basic regions, the Plains, or "area of low relief", and the Foothills-Mountain, or area of high relief", then we have two areas in which the problems accompanying surface mining are quite different.

The area of high relief is also the area of highest drainage density and maximum erosion potential due to the highest average precipitation amounts (both rain and snow), and the most intense 24 hr. rainfalls in the Province.

Because of this erosion potential, retention of over-burden and topsoil (where it exists), is difficult. Control works would be very

costly if the job was to be done properly. Breaching of berms or spoil banks by ponded water, sewage or mine waste will be an increasingly common occurrence if operations are expanded in the area of high relief. This will lead to contamination of streams and of soil.

In this region, topsoil is minimal, vegetation is precarious and what exists of either, takes many decades, even centuries to develop, especially at higher elevations. Unlike overburden and topsoil, we cannot set the vegetation to one side and replace it when the mining operation is completed. In those parts of this region above 6000', where only sparse grasses and lichens have developed, it seems unlikely that we could re-establish vegetation cover for many decades, without the use of carefully applied fertilizers and selected seed by which time the scars left by mining would be greatly enlarged by natural processes. This is one area of research which might receive more attention in the future.

Reclamation of mined areas in the Foothills-Mountain region is made more difficult by the slopes encountered, some of which do not allow the use of machinery such as bulldozers. Again, where machinery is used in reclamation, the tendency is to produce local areas of low relief, which reduces the erosion potential but which is not in harmony with the surroundings.

Within the Foothills-Mountain region therefore, we can say with certainty that the problems associated with surface mining are greatest, the possibilities for reclamation are least.

This same region is prime recreational space, space which is receiving increasing pressure from the public for various recreational

pursuits. We talk of paving the Forestry Trunk Road, of upgrading campsites and establishing tourist facilities in this region, yet the countryside is being crossed and re-crossed by seismic lines and other artifacts of mineral exploration.

Competition for use of the land is greatest in the Foothills-Mountain Region, least in the Plains Region. Potential for reclamation is greatest in the latter and least in the former. Cost to the people of Canada for subsidizing production of these resources is greatest in the area of high relief and minimal in the area of low relief.

We would strongly suggest therefore, that the Government of Alberta instigate a plan for the Province in which all areas of potential surface mining are identified, zones established with priorities for development and means established for discouraging or barring development in areas of low potential for minerals or of high aesthetic value. Any changes in zoning for development would result only after public petition and hearings.

Such a plan would result in rational development of our resources, greater profit for the companies involved and for the people of Canada, and would further allow the Provincial Government to implement policies of regional expansion centered on designated growth points, something which has not been very successful till now.

It is our belief that the most rational way to attack the problem would be to identify areas with potential commercial mineral deposits and to issue licenses for commercial exploration and/or exploitation as demand develops. Areas of commercial value would be ranked from highest to lowest potential, least to greatest possible harm to the

environment, highest to lowest priority for area economic expansion, or preferably a combination of these. The index ration would be accompanied by estimates of per acre cost of reclamation so that firms wishing to lease land for exploration and/or exploitation would have some idea of the cost to them of developing a particular property.

This system may be seen as analogous to a system of urban zoning in which a central authority makes key decisions as to the order in which development takes place and what type of development occurs.

The foregoing would avoid the present situation where leases are issued on land with no commercial mineral deposits, but which may be developed for recreational uses in areas surrounding freehold land operating as the headquarters of that recreational facility. By restricting development in some areas, effort can be concentrated in areas of high potential, thus avoiding the sprawl which is so harmful to the environment.

While potential for harm to the environment decreases from west to east, due to increased ease of reclamation, so also does the quality and accessability through surface mining, of at least one mineral with which we are concerned, namely coal. However, the coal of the western region is being produced with various indirect subsidies from the people of Canada while that of the Plains region is not. Further, the Foothills-Mountain coal is an export item while the Plains coal is predominantly utilized domestically, mainly in the production of power, a use which promises to expand greatly in the next 50 years. Thus the market for the former is unsure while

that for the latter is almost guaranteed.

With respect to the setting of performance bonds for reclamation, we feel the bond should be very high in areas where reclamation costs are high and/or competing land uses numerous. This requires the establishment of a sliding scale of bond values based on an assessment of the properties available for lease to be carried out by the Environment Conservation Authority in conjunction with other concerned regulatory bodies.

The Society fully endorses all those concepts put forward in the draft position statement and would urge implementation of these.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

You ask for zoning and planning of various sorts at the provincial level. Do you feel a role for regional planning inputs into these planning procedures?

MR. R. WHISTANCE-SMITH

Very much so, yes. We could visualize this in many regions. We dealt in our brief with two main regions in which the problems were quite different but when one comes down to regional planning at the resource level, more than two regions would be developed and in fact a regional planning input would be desirable.



alberta fish & game association

212 - 8631 - 109 ST., EDMONTON, ALBERTA. 439 4246

3.21 A BRIEF SUBMITTED AT THE PUBLIC HEARINGS

"ON THE ENVIRONMENTAL IMPACT OF STRIP MINING IN ALBERTA"

ON BEHALF OF THE ALBERTA FISH & GAME ASSOCIATION

EDMONTON,

FRIDAY, DECEMBER 17, 1971

Presented by -

Gordon Peel

Immediate Past President

Alberta Fish & Game Association



alberta fish & game association

212 - 8631 - 109 ST., EDMONTON, ALBERTA. 439 4246

I wish to commend the Government of Alberta and the Environmental Conservation Authority for holding this series of hearings to allow Alberta citizens and citizens organizations to present their views "On The Environmental Impact of Strip Mining in Alberta".

The organization I represent here today, the Alberta Fish & Game Association, has done considerable research regarding the impact of strip mining in Alberta on our Environment and has previously presented our views to government, but to date we are far from satisfied that our previous presentations have had any real effect in controlling or minimizing the adverse effect of strip mining on our environment.

First I would like to state that while a study of the effects of strip mining can have a broad spectrum of results, studies of this nature alone are not the answer to solving even our surface environmental problems. We must broaden our outlook and look at the broader spectrum of the various users of our landscape, if we are to arrive at any real conclusions of how to protect our environment.

The very definitions of surface disturbance should all be considered together and not in separate studies as has been the case in the past and apparently still is the approach.

- (1) The removal and or exposure of land surface - under this heading consider strip mining, road building, seismic operation, the forest products industry, cattle grazing, etc.
- (2) The removal of vegetation and or water which results in exposure of land surface - again consider strip mining, road building, seismic operation, the forest products industry, cattle grazing, and surface water use for oil well pressurization.



Alberta fish & game association

(3) The covering up of original land surface with water and or solid cover - under this consider daming for power production, road building, the overburden disposal effect of strip mining.

If we look at any of these situations in these single purpose land use concept, one situation alone would appear to have any significant effect on the supposed vast inhabited areas of our province. But superimpose the overlapping land uses on any one and we find that there are few if any natural areas remaining in Alberta that are not effected by one or more surfact resource users.

The entire concept then of holding public hearings on any one specific resource field is then wrong unless after all such specific resource studies are done that overlay maps are prepared and considered in preparing regulations that will properly govern all resource users. It will come as quite a shock to some to realize that the first resource user may have destroyed a second resource that is invaluable to the cond or even the third and fourth potential user. Perhaps we should consider resource reserves where logical maximum yield utilization by all users could be developed in gical sequence so no natural resource is wasted, but all fully utilized. Our concept that many resources are wasted as not being the consideration of the specific developer at any one point in time.

It would be wise at this point in time to place a responsibility on all resource ers to have on their staff qualified environmental specialists who could consider and vise to resource developer in matters relating to environmental damage potential.



alberta fish & game association

212 - 8631 - 109 ST., EDMONTON, ALBERTA. 439-4246

I represent an organization who is most concerned with wildlife and I would like at this time to make one statement in defence of big game alone facing reduction or extermination throughout most of the eastern slopes of our Rocky Mountains. Industry builds roads and provides access and most big game species depend on solitude and seclusion to escape the deprivations of man. Big game depend entirely on Aspen and Grassland areas for their food supply and aspen and grassland areas comprise only 10% of the total land areas of our eastern slopes. If each individual resource user destroys only 1% of this 10% there will shortly be no place left for our wildlife to live out their lives. Our wildlife can not be placed in a Zoo or live in a vacuum and can't wait for reclamation after development -- by the time reclamation is done, the wildlife species will be extinct. We must protect this critical 10% of our total land area from all resource users. Much of the critical 10% is already under active destruction.

We were given this opportunity to come here to consider and present our views on the effects of strip mining and its effects on our environment. Again I repeat, this is a narrow and wrong approach, as we must consider all resources used and broaden our outlooks if we are to make any real progress in protecting our environment.

We will however limit our further remarks to the Coal Industry and it's single purpose effects on our environment and appended to this report I submit four appendices * that should be considered by the authority.

- (1) An investigation of Coal Exploration Operations at Grande Cache, Alberta
- commissioned by and done on behalf of the Alberta Fish & Game Association
by Renewable Resources Consulting Services Ltd. - October 1970 - and
presented to the Premier of Alberta under cover of our letter dated



Alberta Fish & Game Association

631 - 109 St., EDMONTON, ALBERTA. 439 4246

October 13, 1970

This survey graphically illustrated by a series of photographs indicated that at that time various Alberta statutes had been violated. This survey also included 10 recommendations for immediate action.

(2) An Aerial Photo Reconnaissance of McIntyre Porcupine Mining Operation Grande Cache Alberta -- commissioned and done on behalf of the Alberta Fish & Game Association by Renewable Resource Consulting Services Ltd. - December 1971.

This survey was undertaken as a follow-up to our original survey in October 1970 and the same areas were surveyed in an attempt to establish what measures were being undertaken to restore wildlife habitat and prevent erosion damage. The only corrective action that was revealed was that some roadside areas had been cleaned up to possibly minimize the dangers of forest fires.

(3) An article contained in the Alberta Fish & Game Newsletter Defending All Outdoors, Volume 5, Number 6, dated September 1971 -- this article contains information researched by our organization's technical representative, and documents the effects of the Cardinal River Coal Company operations as they effect Cabin Creek or possibly I should say have biologically destroyed Cabin Creek.



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- (4) A series of photographs illustrating the lack of concern for our environment in roadbuilding, overburden disposal and strip mining development by Cardinal River Coals.

The first appendix to this brief contains 10 specific recommendations for action that we feel are valid and are of course to be considered as recommendations as a part of this brief.

The second appendix graphically illustrates many of the forecasts and assumptions contained in our first Appendix that was originally prepared and submitted in October 1970. The second brief also illustrates that the 10% critical wildlife areas I previously spoke of is being developed and destroyed by strip mining and that this is being done in high alpine areas that cannot be reclaimed because of the delicate ecology of the alpine meadows.

The third and fourth appendices illustrate the destruction of one creek and one watershed area without regard for the future in a second area of the province. We therefore feel that the technical surveys presented as our Appendices 1 and 2 covering Grande Cache area are valid throughout all areas of the province where strip mining is being developed or considered in mountain areas.

The costs of the technical research done by and for our organization and presented is in the thousands of dollars and I apologize to the public that it is impossible to read these full reports or distribute copies of the graphic photographic illustrations contained in these reports. The costs to our organization have been considerable, but if the coal industry spent less funds on defensive publicity and more on technical environmental research the industry could be developed in harmony with our environment.



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- (1) It is the contention of our organization that there are no adequate regulations to govern strip mining in Alberta.
- (2) It is also our contention that it is impossible to reclaim or even minimize the permanent damage that already has been created in some mountain areas of Alberta.
- (3) It is our contention that strip mining should not be allowed in any areas that are critical summer & winter range for wildlife and that are impossible to reclaim with any technology yet developed.
- (4) It is our contention that strip mining should not be allowed in any areas where the overburden cannot be contained in such a manner to prevent erosion^{and} that the water retention capabilities of our eastern slopes are retained.
- (5) It is our contention that the Willmore Wilderness should be renamed the Willmore Resources Preserve or if not rededicated under the terms of the Wilderness Act as a Wilderness Area before further dispositions are made from it.
- (6) It is our further contention that the overlapping effect of all resource users previously mentioned should be considered in making regulations that effect our environment.



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It is our recommendation that an Economic Survey be undertaken to evaluate the economic benefits of the coal industry to Alberta in terms of revenues from leases and royalties, value of job opportunities created for native Albertans, value of any secondary industries created. Also this survey should consider the costs of railway and road development paid for by Alberta taxpayers that have been built to accommodate the coal industry.

It is known that the world energy reserves are not unlimited and are fast being depleted at an alarming rate. Is this the correct point in time to develop and export this resource in a raw-state at todays price. A secondary industry could be developed to refine the product by exporting our coal in the form of the more refined product coke. But will the price of any form of energy not be far more valuable in years to come as the world's supply is further depleted.

I will close with the remark that coal is a non-renewable resource. We are allowing the uncontrolled development of a non-renewable resource to destroy our environment which we must realize should be a renewable resource. Speaking for a Wildlife Organization I will remind you Wildlife is a renewable resource but harder to define in dollars and cents, but I as a hunter enjoy the pursuit of wildlife and if we consider one ton of coal worth only 10 cents royalty the first deer I shot by comparison in dollars and cents probably cost me 5,000 tons of coal and that is an economic fact.

* Appendices are not published with these proceedings, but are available in the Information Centre of the Environment Conservation Authority.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

The question that you raised about the propriety and the desirability of studying the impact on the environment of all resource developments in one over-lapping package we subscribe to. We are conducting a continuing series of hearings on the environmental impact of resource development. Strip mining is being considered first and the others in a subsequent series of hearings. You might wish to advise us how we can move from one set to the other in a way that is helpful to the public.

MR. GORDON PEEL

We and another organization, The Alberta Wilderness Association, prepared overlay maps of all existing leases and developments affecting five or six of the industries I mentioned. I believe we can make those available to you, to show you where this overlap is occurring and how little land in the eastern slopes of the Rockies is not under some form of lease of exploitation at the present moment.

3.22

THE WIGHTON FAMILY

Presented by: Carla Wighton

THE ENVIRONMENTAL IMPACT OF SURFACE MINING

IN ALBERTA

A brief submitted to the Province of
Alberta Environment Conservation Authority
by: Dennis, Patricia, and Carla Wighton,
this day December 17th, 1971, Social
Room of the Northern Jubilee Auditorium.

We believe that we should first understand our global situation and the following introduction will perhaps lay the path to a planned Canadian economy which will lie within the context of a balanced global condition. We believe that the predicament of humankind results from the interrelationships of population, capital investment, geographical space, natural resources, pollution and food production.

From these major sectors and their interactions appear to come the dynamics of change in the world system. Rising population creates pressures to increase industrialization, grow more food, and occupy more land. But more food, material goods, and land tend to encourage and permit larger populations. The growth in population, with its accompanying industrialization and pollution, comes from circular processes in which each sector both enhances and feeds on other sectors. But in time, growth encounters limits set by nature. Land and natural resources become exhausted, and the pollution assimilation capacity of the earth becomes overloaded.

The battle between the forces of growth and the restraints of nature may be resolved in a number of ways. Us humans, if we understand well enough and act wisely, can choose a path out of the conflict of world pressures that is more favourable than present actions, attitudes and policies portend.

Such a path must be toward a non-growing and balanced global condition.

Let us now consider within this concept the export of an unrenewable resource: Alberta coal; the possible extraction of 45.4 billion tons which will be transformed into other solid, liquid and gaseous forms throughout our planet. The question we ask is, should this additional environmental load be allowed to escape. Do we as first line extractors have the moral right to initiate this transformation without first researching the environmental impact not only from the extraction process but also from the total transformation process.

We suggest as yet, our biological environment of which we as fancy apes are an intricate part, has not had a dollar value placed upon it.

Furthermore, we feel that the Provincial Government should consider the introduction of "user fees" for materials removed from the environment.

These fees would be paid by the original producer or importer of raw materials. It would be set for each material to equal the social cost to the environment if the material were eventually returned to the environment in the most harmful way possible. The fees would be refunded to anyone who could certify that he had disposed of the material, with the size of the refund depending on the method of disposal.

We ask whether we also have the right to sell our future generations heritage in as fast a time as possible to make a buck to satisfy the present status quo. We also suggest that it does not take a clever politician to sell unrenewable resources to energy hungry nations, but it takes an individual with foresight and conscience to plan our economy within the global context and to seek ways to lighten our future generations problems of resource depletion and rising pollution rates.

We assume that we live under a capitalist system , thus we wonder what kind of capitalist would rapidly deplete his capital (in the form of unrenewable resources) when this capital is not being replaced. We therefore ask the Provincial Government of their plans for Alberta when the unrenewable resources have gone.

We suggest that Canada act in a responsible way in regard to assisting the industrialized nations of the world to reach an equilibrium with the environment by not supplying all their raw energy demands. We refer you to a related example: The N.A.W.A.P.A. Water Diversion Scheme, which, if it had been initiated in 1970 and completed by 1990, would not have produced enough water to satisfy the United States 1990 demands which quadruplicate every time the population doubles. Energy consumption will take a similar pattern hence Canada's long term needs and provincial long term needs require the utmost attention. For instance, it is no secret that coal from Genesee Alberta area will become competitive in price with natural gas for Edmonton electrical requirements by 1988.

After considerable research has been undertaken in the areas we suggested, the possible extraction of Alberta coal should be carried out in an orderly and strictly controlled form. We therefore make the following suggestions in regard to this extraction:

1. No extraction take place under any conditions on or around mountains.
2. Under no conditions coal extraction take place in Provincial and National Parks.

3. Approved deep-mining allowable in selected locations of the foot hills area with severe reclamation regulations enforced before mining commences.
4. Approved strip mining operations be allowed in the plains region with severe reclamation regulations enforced, before mining commences.
5. Absolutely no mining operations be permitted within one kilometer of any water shed, i.e. creek, creek-bed, ravine, river and lakes. Absolutely no mining effluent be allowed to enter any type of water shed, creek-bed or ravine.
6. We suggest that a suitable fund for financing reclamation operations be set up from mining company posted bonds. This fund should be in the region of from 70-100 million dollars. The fund would not only finance the workings of the reclamation process but would finance research into selection of trees shrubs, grasses, etc. which would be best suited to grow on reclaimed areas. Ground city garbage and local overburden material might also be considered as a growing mulch layer in combination with sand, gravel and silt.

As often as possible, native trees, shrubs, grasses and soil be selected from the overburden site and carefully removed for later transplant after the mineral has been extracted. Other materials not regarded as suitable for transplant be used as grinding material (mulch) and as pulp or Provincial Park firewood. Reclamation plans and finances designed by the co-ordination of the Provincial and Federal government departments of Lands and Forests, Wildlife, The Environment, Mines and Minerals and the mining industry should be presented to public hearings via the Environment Conservation Authority for final approval before any mining operation commences.

The entire mining and reclamation operation should only be supervised by field staff from the Dept. of Lands and Forests and the Environment. Opening and closing of trenches should take place simultaneously.

Additional qualified staff should be hired for these departments as the need arises. The Attorney General's department must be informed of any mining operations and be equipped to deal with the legal aspects of posted reclamation bonds and court actions against any violations of the new regulations.

We feel it unnecessary to use heavy equipment such as bulldozers for prospecting. Methods such as aerial infra-red photography and survey parties on foot are adequate. If a job is to be done, let it be done well. Construction of roads and transportation routes be part of the total mining and reclamation plan submitted to public hearings before operations commence. Transportation of coal be by rail, using the existing routes and terminals as often as possible.

To end, we remind the Provincial Government that the resource extraction, transportation and export provides little employment for Albertans because of the high degree of mechanization. The reclamation process will probably provide more job opportunity. Export of raw materials also exports job opportunity for Albertans.

3.23

INTERNATIONAL UNION OF
OPERATING ENGINEERS

PRESENTED BY MR. IRVIN C. NESSEL

MR. I.C. NESSEL

Mr. Chairman, Members of the Authority, Ladies and Gentlemen, I also concur with the previous speakers about the lack of time in order to prepare submissions that we feel would be of more use. However we appreciate the opportunity of being able to come before you by way of public hearings. To identify myself, I must say that as a labor representative at this particular state, I do not necessarily voice the opinions of all organized labor within the Province of Alberta. The Alberta Federation of Labor does have a legislative group or committee which is well equiped to handle that particular situation, whether they will or not make representations to your committee I am not aware. I do however wish to speak for the organization which I represent, the International Union of Operating Engineers. I find myself a man of many hats here today, first of all I can concur with almost every previous speaker in that I am a member of the Fish & Game Association, I am a member of Unifarm, I am a

member of the Fish & Game Association, I am a member of Unifarm, I am a member of the Edmonton Sporting Dog Club, I am a human being, consequently I can concur, as I say, with almost all of the representations made. First of all we have a unique situation in Alberta in that we have within our borders practically all species of wildlife, the difference in terrain makes this possible. We are also blest or cursed depending on where you sit, with the raw material and resources that make us probably one of the richest areas in the world. The two are not always necessarily competitive and it doesn't appear that we can continue our present course and maintain the status quo or even the improvement of either one over the other. I question, first of all, the narrow scope of the hearings in that they are restricted to strip mining of coal. I would like to point out that my knowledge is of not quite as a native Albertan, but from the time I was a year old until present I have lived and worked and travelled very extensively in this province and the ravaged area of gravel pits, sand pits, burrow pits, alone, equals all the strip mining depravation that has gone on. I don't condone what has gone on anymore than anybody else does, otherwise none of us would be here. However we must recognize, all of us, that in order to have the type of standard of living which we in Alberta now enjoy, we've got to develop our resources. Whether that means secondary industry here or it means exporting, if we are going to be the two-car, summer cottage, mortgage-free population that we hope to be, we must recognize that this stuff has to be developed. There has to be worked out a balance between the two. In this respect I think what we have to look at is the continuation of the type of authority that we have.

We have to revamp existing procedures because obviously they are not working, haven't worked from the day the first shovel was put into the ground. We must have enforceable land use regulations. Every developer of every kind and all kinds of our resources, should be obligated to file a land use proposition showing not only what he intends to do but how he intends to leave it, and what is going to be the intent of the place afterwards. There must be wilderness areas set aside, not open to political pressures which we've seen in the past. The federal government and provincial governments have set aside park areas and other people have touched on the over-crowding of the parks and the maximum demand of this limited area. Most of the conversation and representations made today were on existing or developing properties. I would suggest that the abandoned properties also need a lot of attention. The original users may not be able to be found. Some of them may not lend themselves to practical reclamation to the extent that they are going to be of any more use to us now than before the mining development occurred. I am speaking of certain areas in the Drumheller area, etc., that were badlands. They are of no use for farming, somebody pointed that it's \$3500 per acre to reclaim what they could have bought for \$40.00 an acre. However, at \$40.00 an acre original land use, the price of reclamation wouldn't go up if they were not a mining development. So the mining companies, of course and we all recognize, that they are a powerful group even as our group. Organized labor is a powerful voice and many of the groups represented here today do represent a lot of votes and that's really what we are talking about. Whether we like it or not, we can talk about non-political participation or non-political groups and individuals and so on and so forth, the authorities to be set up where there is no political motivation, they are only there by the stroke of the existing government. And they

can be removed when you have a new government. We must recognize that. So that all the regulatory authorities only exist at our will. I am not saying that they need to be improved. The reclamation of the old abandoned areas, to the most practical use, is desirable and is necessary. We have within two miles of us an abandoned gravel pit; a municipal authority, the City of Edmonton, owns the gravel pit. They removed the gravel and left the land in a hell of a mess, then when they decided that they had to build more roads through existing parkland in order to feed the traffic in and out, somebody came up with the idea that this would be a beautiful park and they have developed Mayfair Park. Very valuable land, in the centre of the City. But of more benefit to us as a park, I feel, as citizens of Edmonton, than all the housing, highrises, that might be developed there. Many of the mining companies, particularly the strip mining companies, people that I represent, work seasonally. Mr. Coates, the people across the river at Forestburg, are busily employed mining coal predominantly in wintertime and in the summertime they are lay-offs. The members I represent in both those areas have no gainful employment during the summer months and I would suggest to the Authority and certainly the the companies that these people and the equipment which is in some cases lying idle could be put to good use in the reclamation of these particular areas. One thing further is the age that we are in which is very mechanized and of course in this particular respect the operating engineer is the bad guy, along with the mining company. He is the guy that runs the big bulldozer and shovel and tears the country apart. But he has to make a living too. Many of the developing and transportation technologies require highly skilled machine operators. The equipment is getting so sophisticated that it is not uncommon to pay, for example, a D9 Dozer roughly \$128,000.00. A very sophisticated piece of equipment and while

this doesn't fall within the purview of this particular committee, I would suggest that some pressure should be put on inter-governmental departments, particularly apprenticeship tradesmen's qualifications people, that these abandoned gravel pits or unreclaimed areas lend themselves ideally to suitable training ground for equipment operators. This is an area that hasn't been touched. These are just some of my comments. As I say the operating engineers are as concerned as every body else in keeping Alberta probably the most wonderful area in the world by virtue of the wildlife and the resources that we do have. We want to work very hard in maintaining that situation and we pledge our full support. Thank you.

QUESTIONING BY THE AUTHORITY

DR. WALTER TROST

You touched one point that is of considerable interest to the Authority and that is the manpower training needs that might be involved in reclamation matters of all sorts. Would you like to elaborate on that?

MR. I.C. NESSEL

When you talk about reclaiming existing areas, we should look at abandoned areas more than anything else because in the areas where there is mining being undertaken, I feel that they are the responsibility of the mining company. There are many programs, schemes, and funds available through the training authorities by industry training and federal government scheme, where the federal government picks up 75% of the cost on a cost-share basis with the provincial government. None is available however, to industry for industry training programs whereby people who have the necessary skills and equipment could, during the off-season, develop this reclamation training. The existing mining companies should bear that cost, but certainly the educational authorities, the adult vocational training people, should be looking at some of these areas.

Distance doesn't really mean too much because many people go from Edmonton and Calgary to provincial parks where it does have a use. It does have an end use that can be developed. The gravel pits out in the east end of town could be developed through a training program by using equipment, and training the people to operate that equipment; for a land fill. The whole south end of Chicago is built on a bog. The tailings from the mills, the slag from the steel mills, were dumped into the south end of Lake Michigan and housing developments built on top of that swamp.

There is much that can be done. We are not saying that it all has to be diverted to recreational purposes. The City of Edmonton is in a desperate need for land-fill garbage disposal area. They have been negotiating with surrounding counties for two years and cannot come to any solution so there are many of these areas that can be used for practical purposes as well as recreational facilities. The government involved with training should be looking at some of these things. To say that somebody has to pay for the clean-up makes the cost pretty prohibitive. It costs approximately \$15.00 an hour to run the D9 with no profit included. If we are going to do something worthwhile we might as well make the maximum use of the expenditure and train the people into usable occupations. There is a crying shortage every summer for heavy equipment operators all across North America, not just in one particular area. This is one area that would lend itself extremely well to a training facility.

MR. PAUL BABEY

In your suggested use for unreclaimed sites I take it you wouldn't object to using these sites in connection with reclamation research as well?

MR. I.C. NESSEL

Many of these areas, nobody knows who owns them or who is responsible for them. I would make one further recommendation that once a mining facility of any kind has been depleted, that land should then fall back to the Crown for the ultimate use of the citizens. To leave it in private developers' hands we find ourselves back in the situation that you see across the line in many areas; where the governments have been negligent in developing recreational areas for the good of the citizens and private developers have got hold of them. They have developed them on a purely profit basis and they are gouging the public just as much as the original miner was. I do not know whether I have particularly answered your question but I would like to see them all revert back to the Crown for the maximum use of the public.

3.24

Strip Mining Regulation From the
Viewpoint of the Resource
Economist

Brief
Submitted to the
Environment Conservation Authority

Edmonton

December 17, 1971

Wolfgang M. Schultz, Ph.D.
Agricultural Economist
11423 - 74 Avenue
Edmonton, Alberta

A Controversial Subject

Strip mining is ugly, horribly visible, beyond comprehension, and it utterly destroys the natural environment.

Strip mining is also efficient, safe, and with care, its effects upon the environment can be kept under control.

If we must mine our coal, and open pit mining is the method of choice, and if the total environmental impact in the chosen locality, after careful assessment, is acceptable, let us not be unduly squeamish about it.

Social and Technological Change of the Last Half Century Require Re-assessment

In Canada, the wonderful time of nomadic hit-and-run exploitation has come to an end. We can no longer strip a place of its valuables then move on, leaving behind a ghost town and perhaps a horribly scarred landscape, because the Great Empty Land beckons us to do so. There is now a finite space to go to; and there are enough people around, destined to live in this country forever. The sooner mining operators realize that the country at long last, accepts the reality of the situation, the sooner they, too, will accept the responsibilities that are part and parcel of the privilege they enjoy by having control of some of the country's valuables.

Some Effects of Mining Not Reflected in the Firm's Financial Returns: External Effects Lead to Conflict Between Private and Public Interests

It is unreasonable to expect the mining industry to do "the right thing" in environmental protection without giving proper guidance. Mining practices have developed over very long periods of time, and changes introduced by individuals concerned follow the path of least resistance, "doing what comes naturally". Mine operators with more powerful machinery, and a mandate from their stockholders to bring home the bacon, simply should not be counted upon to set standards of environmental protection that would satisfy every nature lover.

The salient point here is that damages from open-pit mining, if they occur, do not hit the operator or the stockholder, but the residual owner of the land--in the case of Crown Land, the province, and therefore every citizen. Because these effects occur outside the firm that brings them about, they are called external effects, or external economies (to the mine) or diseconomies (to the public).

Property Rights are Essential to a Free Economy.
They Control the Disruptive External Effects.

We often pride ourselves that the free economy whose fruits we enjoy makes everybody decide for himself, yet "as if guided by an invisible hand" we contribute to the common wellbeing. Economists today are aware that this "invisible hand" is not a mythical, transcendental, metaphysical or divine will above us; it is the system of mores, values, laws and specific regulations of society and its institutions that make this system work. Property rights, by ensuring that those who spend the most effort on using the resource entrusted to them reap the most rewards, are rightly considered a capstone of our social system that makes a free or decentralized economy work. Historically, the rights to use and enjoy resources that it was technically possible to measure--land and items firmly attached to it in particular, but also many related items such as the privilege to hunt, to use the natural bodies of water appurtenant to the land, for example--have enjoyed the privilege of exceptionally good legal protection. If I'd interfere with the owners right to quiet enjoyment of his property, the law would bring me to heel--if the nuisance was noise, smell from a pile of manure, or just plain stealing. But oddly enough, the perhaps much more dangerous, but relatively novel hazards to my breathing such as sulphur dioxide, nitrous oxide, mine wastes in my favourite fishing stream, and such like unwanted by-products of progress often go unrecognized by the law for a long time, just as if Lady Justice still dwelled in the pre-scientific world where the unaided senses were trusted more than the greatly improved scientific sensing devices which are in common use tody. Methinks Lady Justice blinks at times; could it be that she suffers from too much smoke in the eye?

Mining Privileges Granted Liberally to Get Canada Going

Mining development in this country, just like railroad, ranching, crop farming and lumbering are in a somewhat peculiar position with regard to property rights. In the interest of speedy settlement and development of a viable economy, property rights were conferred at very liberal terms; so liberal in fact, that many amounted to a gift without compensatory consideration. The cost of a piece of the mineral rights was the effort to find the place, stake it, and register it--once that was a formidable enough task. Today we simply must recognize the vast changes that have occurred because of increased population and vastly changed technology.

Technological and Institutional Change Have Rendered
Old Policies Obsolete

For example, it might have been quite appropriate once to charge ten cents per ton as the price of coal removed when the first coal mines opened in Alberta. A miner's daily output was perhaps ten tons, much of the mining equipment used was procured locally. So the net return to the province was by far greater than the nominal royalty. - But

consider the situation today: the productivity of a miner in an open-pit mine is perhaps 1000 tons a day; most of the equipment used in the business now come from faraway places such as Marion, Ohio, Brantford, Ontario, Flint, Michigan, Osaka or Dortmund. At the same time, our provincial government, instead of inducing private business to invest in railroads, has found it necessary to make an imposing gesture of goodwill and invest \$120 million in a railroad to coal fields. The cost of absorbing a "spent" mining town and its people into the economy--retraining, unemployment compensation, re-settlement, economic obsolescence of the public investment in roads, rails, schools etc. have increased price tags. All told, the balance of the indirect economic effects of coal mining on the provincial economy probably has shifted to such an extent so as to demand a profound re-assessment of the royalty rate now collected by the government. Add to this the fact that inflation has reduced a World War I ten cents to about a cent in purchasing power, consider the world energy outlook over the next few years, and you will probably come to the conclusion that the coal royalty for top grade low volatility coking grade coal should be \$10 per ton, not 10¢ per ton.

A product that is not priced according to its reasonable use value will be squandered away. This is true in the short run, but is of paramount consideration in the long-term thinking that must be the basis for wise public decisions.

With an appropriate price tag on the raw material, mine operators will begin to take a second and third look at the huge amount of "waste" now piling up, the low-grade coal, the solubles and suspended solids now being swept away in former trout creeks--because under present price conditions someone did not see fit to spend an extra day's cat-skinning to build up the levee of a settling pond to withstand normal flooding.

A Charge for Temporary or Permanent
Removal of the Living Land

We now take a second look at the destruction of the surface by open pit mining. I am sure the specific effects upon previous land uses--farming, timber growth, grazing, game animals, recreational values--can be ascertained. But I submit that the government, as the guardian of the public domain, the lands vested in the rights of the sovereign, the Queen of Canada, need not base the asking price for a piece of the landscape, be it temporary or for "as long as the rivers flow and the sun shines," upon its cost, even though a more accurate knowledge of the side effects would be a definite asset to the government as a bargainer. But the government, as owner of the land, has every right in the world to demand a price, a rent, for the estrangement of the surface, i.e., the entire biosphere, plants, animals, and soil, from its natural state. In addition to determining safe minimum standards of operation, the government could make quick, efficient and lasting reclamation a concern of the mine operator himself by charging a rent for the land worked over from the moment it is stripped of its vegetation to the moment it is returned to the public domain reasonably reclaimed, re-vegetated and

with acceptable soil cover and topography. Oil companies pay generous rents to private landowners for the lease of the well sites; coal companies should be expected to pay rents in the same order of magnitude, perhaps \$100 per acre per year and up.

A Graduated Rent to Align Private With
Public Interest

An additional incentive to speedy reclamation may be provided by graduating the rates, increasing them by a certain percentage every year in order to provide a stimulus to use as little land as possible in current operations, and speed up the process of reclamation. If mines find it profitable to reclaim, because the rental rates would exceed the cost of reclamation, we can hope to "internalize" the true cost of the pit, charge it to those who reap the profits from the sale of the processed coal.

This approach would have another salutary effect: mines established in areas where reclamation is slow, or even impossible (above the tree line in the mountains or in other difficult places) would be demanded by mine operators only if their returns clearly exceed the huge costs in terms of long-term impairment. There would be greater incentive to favour initially the sites that are easy to reclaim.

Safe Minimum Standards of Operation
Still Necessary

Pricing the public property for the exploiter in such a way that it pays him to husband carefully the public property entrusted to him would be a useful addition to the means at the disposal of the owner to protect his rights. It would not replace more direct measures, clearly defined safe minimum standards of operation set up for each and every mining operation, and enforced fairly, but severely. As long as there is a chance to get by with less, unscrupulous operators will always try to circumvent the law, or the contract. Safe minimum standards should be established to prevent, if at all possible, the deterioration of a resource so to make it unfit for a "higher" (more profitable, or socially more desirable) use. The basic principle must be that "an ounce of prevention is better than a pound of cure." Operating standards should assist the mine operator to do what is required as efficiently as possible, if a balance is struck of public (more or less diffused) and private (clearly accruing to the company) or effects.

For example, most open pit mines are left wildly ridged, rendering the topography unfit for many uses. They interfere with future cultivation and transportation, they impede tree growth and harvesting etc. etc. Why it should not be possible to replace the overburden from the pit in more or less level patterns I can't understand. There may be a puny saving in time and operator effort if, moving along in a straight pattern, the dragline unloads forever in the same distance from its current location. But it should be possible to avoid huge levelling

costs or, alternatively, permanent impairment of future uses, with a very small increase in current operating costs--perhaps with no cost at all.

Without Enforcement All Efforts Would be Wasted

Lastly, public control of open pit mining must be exercised to be real. One must question the managerial ability of a government that leaves the ultimate enforcement of mine reclamation to an unwieldy public body with several dozens of members. This administrative construction simply does not work in public or private organizations. It is an open invitation for those holding the public trust to circumvent the rules; it is a signal of the government that it will consider benevolently the infractions, it is an invitation to defy the law and good government of this province. The sooner we get a system of control and enforcement of mining in the province in line with good managerial practices the better.

Three Additional Comments

1. A mine operator could rightly expect to have the conditions of his license spelled out in advance. But he cannot expect to be absolved from his liability for material adverse effects found after the license is issued, or developing as a result of slow cumulative effects of his operation, or because of changes in the technology he employs. The owner must reserve the right to re-open to contract, much in the same way as the mine operator likes to reserve the right to terminate the contract of his employees if the financial picture dictate the replacement of another man by another machine.

2. The Oil Sands are going to be mined in open pit fashion. The experiences and regulations applying to coal mines will have to be applied to this emerging gigantic technological monster that will chew through thousands of square miles of Alberta territory.

3. At the present time, only a tiny fraction of the total social research effort is directed to the biological and social effects of our galloping march of progress. Not only are investments in applied research, development and design in these areas puny compared to the research, development and design effort spent, as a matter of course, on hardware, there is a corresponding disproportion in investments in the basic sciences feeding the art of engineering on the one hand, and the art of stabilizing and developing society and our natural environment on the other. - Time will tell if our priorities today are the right ones. But I wish to submit that the share of our research dollar devoted to social and biological problems is so small compared to the share allocated to the physical sciences, that even a doubling of the share of former, will hardly be felt in the latter.

3.25 Communication Employee's Fish and Game Association

We feel that the position statement as prepared by the Department of the Environment is a sound basis for legislation governing surface reclamation.

There are however, several areas that should in our opinion, be enlarged upon. They are as follows:

1. Under paragraph 4.10 entitled Power of the Minister, we would like to see strict controls placed on the amount of particulate matter released by any means to water courses or bodies of water as a result of a surface disturbance.
2. Paragraph 4.11 entitled Retroactive Application, is undoubtedly a very necessary and important feature of the proposed legislation. We would hope that the retro-active feature would extend as far back as is feasible. We have a definite desire to see this feature extend back to the days of Federal Government control of minerals prior to October 1, 1930.
3. The financial security deposit mentioned in Paragraph 4.12 should, we feel, be an amount of money large enough to provide for total reclamation in the event the surface disturber should become defunct before completing such reclamation. The legislation in question should allow automatic increase or decrease in the required amount of the security deposit depending on the percentage state of ongoing reclamation by the surface disturber.

In conclusion I reiterate that the position statement of the Department of the Environment appears to be an excellent base on which to build legislation to govern our surface re-clamation problems.

Thank you,

W. G. Pigeon,
Environmental Chairman
Communication Employee's
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This brief has been prepared and is being submitted by Walter G. Pigeon, Environmental Chairman, Communications Employee's Fish and Game Association.



June 26